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**Non-participation in public engagement with science  
A study of four socio-economically disadvantaged, minority ethnic groups**

Dawson, Emily

*Awarding institution:*  
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**Author:**Emily Dawson

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**Non-participation in public engagement  
with science: A study of four socio-  
economically disadvantaged, minority  
ethnic groups**

**Emily Dawson**

**A thesis submitted in partial fulfilment of the requirements for a  
PhD degree at King's College London**

**School of Social Science and Public Policy  
Department of Education and Professional Studies  
King's College London  
March 2012**

## **Abstract**

In the UK relationships between the sciences and society are increasingly managed via attempts to encourage 'public' engagement with science (PES). Opportunities to engage with science are however, not accessible to everyone. This qualitative study explored the experiences of people from socio-economically disadvantaged, minority ethnic groups, who are underrepresented in PES audiences. The original contribution to knowledge of this thesis is an empirically based analysis of why participants from such backgrounds do not participate in PES, an understanding of which was previously missing from the field.

Adults from the London borough of Southwark were recruited for this exploratory study from four minority ethnic community groups; a Sierra Leonean group (n=21), an Asian group (n=13), a Somali group (n=6) and a Latin American group (n=18). Over a one-year period participants took part in focus groups, interviews, accompanied visits to PES activities and participant observation, following an ethnographic approach. Theoretical tools from the work of Bourdieu formed the overarching framework for the analysis, augmented by perspectives from intersectional research on social disadvantages, migration studies, identity theories and theories of learning. Three lenses were used to examine non-participation in PES; (1) social context and social positions; (2) personal views and experiences, and; (3) PES in practice.

The findings of this study suggest that non-participation in PES is complex. Participation in PES was limited by the daily struggles of participants' lives as migrants in London, by their attitudes towards science, politics, science education and PES institutions, by identifiable PES practices and by the relationships between participants' social positions and the structure of PES as a field. While elements of PES practice were found to be problematic, this study suggests participation in PES could enrich the lives of people from socio-economically disadvantaged, minority ethnic backgrounds, especially if more inclusive practices can be developed.

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## Chapter 1: Who is the ‘public’ for public engagement with science?

### 1.1 Introduction

In 2006 I began work on a cross-cultural science communication project aimed at bridging a perceived cultural divide between scientific research on genetic testing and the lives of further education students from minority ethnic backgrounds living in southern England. The irony of the project was that the vast majority of those who took part came from White European backgrounds. While the project may have helped these students understand more about genetic testing, it did little to overcome any cultural divides that may have existed between scientific research and minority ethnic cultures. In many ways this thesis emerged from that project and others like it. While designing, delivering and researching public engagement with science (PES) projects in museums, science centres, festivals, universities and more explicitly political contexts such as policy consultations, I realised that I encountered the same kinds of participants again and again, sometimes quite literally.

Having noticed the lack of diversity amongst the participants of PES projects I was involved with, I turned to colleagues as well as the academic and grey literatures for information and advice. While colleagues were happy to share anecdotal evidence with me from their own experiences, I was struck by the limited information available in the literature about non-participation in PES. Despite a considerable amount of research on the personal benefits of participation in PES activities provided by museums or science centres, or the social benefits of public participation in political consultations on socio-scientific issues, there was little about non-participation in terms of social groups and broader social inequalities.

Within the different PES literatures it was possible to trace information about who did participate in PES. Most participants appeared to be families and young people from White European, middle class backgrounds, living in urban areas (Department for Culture Media and Sport, 2007; Ipsos MORI, 2001, 2006). The

patterns of participation suggested by research provided broad, albeit clumsy suggestions about which groups were missing from PES; people from minority ethnic backgrounds, socio-economically disadvantaged backgrounds and people from rural communities. Reports from the museum sector were available that provided more detail about why people from certain communities did not visit museums (see for example Tissier & Singh Nathoo, 2004). These reports however, contained little or no information about science engagement practices. This thesis provided an opportunity to explore non-participation in PES in more detail. To focus on people who do not participate in PES, and to try and understand why and how patterns of non-participation persist. I hope that through developing a better understanding of non-participation, this study may ultimately contribute to improving PES practices and the creation of a more equal playing field for participation in PES. Thus, this study enabled me to develop a more critical perspective on PES, by asking questions about which publics ‘public’ engagement with science was really for.

## **1.2 Science, society and public engagement**

Science plays an important and well established part in contemporary British society. In 1995, in her book on the relationships between the media, scientists and publics, Nelkin described the role of science as follows:

Scientific and technological choices affect our work, our health, our lives. We pay for their implementation and bear their social costs. Public understanding of their social implications, their technical justifications, and their political and economic foundations is in the interest of an informed and involved citizenry. (1995, p. 172)

Although Nelkin’s research was carried out in the US, her comments are relevant to the situation in the UK, indeed, the central role of science to life in the UK has been noted by many (Michael, 2006; Osborne & Dillon, 2008). As Nelkin suggests in the extract above, if science is an important part of society, then the ability to understand and access scientific information is equally important. Ziman goes so far as to refer to exclusion from scientific knowledge as a form of

inequity, declaring: “science is now a major factor in everybody’s lifeworld. People without some control over its sources feel like puppets on a string.” (2007, p. 264). Discussions about the need for members of the public to access and understand scientific information are, therefore, well established and draw on rationales about citizenship, democracy, socially accountable scientific research and public funding amongst others.

Over the past three decades in the UK, relationships between science, publics and the governance of science have been increasingly managed using science communication and public engagement mechanisms. In the UK, PES has become an umbrella term that includes practices in science centres, museums, zoos and other informal science learning environments, as well as consultations on political socio-scientific issues and sometimes the media. PES has received much attention in the policies of successive governments, as well as government support in the form of public funding. In the UK, therefore, PES can be seen as a growth industry.

The problem driving this study is that certain social groups seem to be missing from PES publics. As outlined above, research on those who do participate in PES suggests that a large number of people in the UK, from minority ethnic backgrounds, socio-economically disadvantaged backgrounds and rural areas are not involved in PES (Department for Culture Media and Sport, 2011b; Ipsos MORI, 2011; The Association for Science and Discovery Centres, 2010; Wellcome Trust, 2008). Engagement with science can, therefore, be seen as a resource for some publics rather than others. This observation is particularly surprising however, given that while PES was becoming an established mechanism for improving science and society relationships in the UK, the New Labour government was simultaneously heavily invested in developing policies and practices to combat social exclusion. The durable nature of non-participation in PES by people from particular social groups, despite a national agenda for social inclusion in the cultural sector, gives cause for concern and raises questions about the relevance and sustainability of PES in a rapidly changing, multicultural society. It also suggests that non-participation in PES has been

insufficiently understood and, as a result, attempts to develop inclusive PES opportunities may have been limited and able to do little to address the causes of non-participation.

Although the need for members of the public to understand and access scientific information has been widely acknowledged, less attention has been paid to which members of the public are involved in science engagement practices and why. While research from science and technology studies has developed an empirical base from which to criticise the concepts and practices involved in science communication, research from science and technology studies about public participants has focused on particular groups in specific science and society controversies (Irwin, Dale, & Smith, 1996; Marres, 2005; Michael, 2009). The extensive literature on museums, galleries, science centres and their visitors is similarly limited by a focus on specific publics, in this case, those audiences who already involved in museum visiting. However, some research within museum studies and research on arts participation has investigated certain aspects of non-participation in more detail (see for example Lynch, 2001, 2011; Sandell, 2007; Tlili, 2008). While in North America some exploration of the PES experiences of certain minority ethnic groups and working class, urban communities can be found (see for example Garibay, 2009; National Research Council, 2009; Rahm & Ash, 2008). In the UK, however, these aspects of PES remain under-researched. From a sociological perspective, there are, therefore, unanswered questions about the role of PES in British society: which social groups do not participate in PES and why? What roles might PES play in the reproduction of social inequalities, or redressing such inequalities?

As Irwin and Michael have suggested, research on what they describe as the “multidiscipline known as the ‘public understanding of science and technology’ ” has “by and large, a commitment to micro-social analysis, that has often neglected broader social and cultural processes” (2003, p. xi). This criticism can also be applied more broadly to research in science and technology studies, museum studies and visitor studies. Thus, research on who did *not* participate in PES, why they did not and on the broader social and cultural roles of

participation in PES has remained underdeveloped empirically and theoretically. This study sought to develop research in PES by exploring the under-representation of people from certain social groups amongst PES participants.

In order to explore non-participation in PES this study drew on research from a range of research fields that provided insights into the relationships between different forms of cultural participation and social inequalities. Sociological research on the role of cultural participation has suggested that cultural systems, such as the education system or museums and galleries, can maintain and reproduce existing social inequalities. Such systems might appear accessible to all while instead they provide their resources to some social groups rather than others (Bourdieu, 1984; Bourdieu, Darbel, & Schnapper, 1990; Bourdieu & Passeron, 1990). This suggests that the relationships between social positions and cultural participation may be relevant to the case of non-participation in PES. Intersectional studies have explored these relationships in more detail by focusing on the overlaps between social inequalities and social positions such as gender, class, ethnicity and age (P. H. Collins, 2000).

This study also drew on more specific areas of research within migration studies and science education. For example, research within migration studies has examined the impact of migration on social positions and how people access cultural resources in countries that are new to them (Erel, 2010). Furthermore, research in science education, especially socio-cultural studies of science education has explored the experiences of science students from different social positions in detail. Socio-cultural studies of science education have suggested that students from disadvantaged socio-economic backgrounds, minority ethnic backgrounds and female students may struggle with both the scientific content of education and the way that science is taught (Calabrese Barton, 1998; Lemke, 2001; Shanahan & Nieswandt, 2011).

Taken together, research from these disparate fields suggests that in order to understand non-participation in PES and the broader social roles it plays, several issues might be important. All of these research fields highlight the importance of



social positions in being able to access cultural resources. However, as suggested by the more detailed work from migration studies and socio-cultural studies of science education, understanding the relationships between social positions and cultural participation requires an in-depth exploration of the lives of individual people and their identities, as well as the patterns of behaviour, attitudes and experiences of people within social groups. Furthermore, research on cultural participation and from socio-cultural studies of science education also suggests that particular practices, such as the way science engagement opportunities are structured, may also contribute to patterns of non-participation. What has yet to be sufficiently understood, however, are the relationships between social positions, the structure of PES as a complex field of different events, activities and institutions and non-participation in PES.

### **1.3 Exploring non-participation in PES: An overview of this thesis**

This thesis explores PES from the perspectives of those who do not usually participate in such activities: the ‘non-visitors’, the ‘excluded’, those for whom public engagement with science is not necessarily ‘public’. In order to do so, building on the contributions of the various literatures outlined briefly above, this study took an in-depth, exploratory approach to understanding non-participation in PES in terms of the contexts of people’s lives, their social positions, attitudes, experiences as well as exploring specific PES experiences with the research participants.

This study contributes to theoretical and methodological aspects of research about PES. As suggested above, existing research on PES has been narrowly framed, such that those excluded from PES have also been under-researched. This study expands the theoretical reach of PES research by drawing on PES research as well as research from several adjacent fields. The theoretical framework of this study combines sociological theories about cultural participation and the reproduction social inequalities from the work of Bourdieu, with intersectional theories about the influence of identity and social position, including the role of migration, on participation and social disadvantage. These theoretical perspectives are also combined with existing research on PES, including theories

of learning in PES contexts. This study was designed to be exploratory and as a result, it should be noted that it is not comprehensive. For example, rather than working with people in rural areas, since their limited involvement with PES activities can be considered to stem, at least partially, from their location, this study recruited participants from Southwark, a central London borough, who had a plethora of PES opportunities on their doorstep with which they were not involved. Instead of systematically investigating the experiences of people from the different social groups that do not participate in PES, following intersectional theories of social disadvantage, I focused on exploring the experiences and attitudes of people who occupied the overlap between disadvantaged socio-economic and minority ethnic backgrounds.

In methodological terms, this study took a qualitative, ethnographic approach to exploring non-participation in PES. The study also followed a participatory approach and the research was thus designed flexibly to incorporate the interests and agendas of the research participants alongside my own. A Sierra Leonean group (n=21), an Asian group (n=13), a Somali group (n=6) and a Latin American group (n=18) from socio-economically disadvantaged neighbourhoods in Southwark took part in this study, generously sharing their views and experiences of PES. Over a one-year period participants took part in focus groups, interviews, accompanied visits to PES activities and participant observation.

The findings of this study suggest that relationships between participants' social positions and structural limits to the field of PES, participants' habitus and aspects of PES practice all contribute to non-participation in PES. Thus, non-participation in PES can be understood as a complex issue. In other words, participants were unable to access PES and in turn were not particularly willing to participate in PES. The findings of this study also suggest that participation in PES can provide cross-cultural, hybrid science learning opportunities for people from socio-economically disadvantaged, minority ethnic backgrounds. Thus, the novel contribution to knowledge made by this study is empirical data that suggest a new way of understanding how social contexts, social positions and PES

practices limit participation in PES and how people become disposed towards non-participation in PES. Furthermore, this study also contributes an understanding of the potential benefits participation in PES may offer those who do not currently take part, and suggests that more inclusive PES practices could be developed.

This thesis is comprised of eight chapters, including this introductory chapter, which provides a brief background to this study and an overview of the thesis as a whole. Chapter 2, 'Perspectives on public engagement with science: A review of the evidence', explores the various relationships between science and society in the UK, the development of PES and the influence of social inclusion policies on PES practices. Theoretical perspectives on the relationships between cultural participation and social disadvantage are then reviewed in relation to participation in PES as a cultural field. Existing empirical research on patterns of participation in PES is reviewed alongside relevant research from science education. Through the literature review, arguments are put forward that suggest PES practices are exclusive and serve to maintain social inequalities in the UK. Chapter 2 ends by suggesting the three research questions around which this thesis is organised.

Chapter 3, 'Methodological approaches and research methods', outlines the philosophical background to this study and the research design. The ontological, epistemological and axiological perspectives that underpin this research are explained first. On the basis of these perspectives, the methods chosen to carry out the research are outlined, including axiological issues about participatory research, equity and the role of the researcher, as well as an account of the qualitative, ethnographic and multiple methods approaches taken. The details of the research design and data collection are described. The problems of carrying out research on non-participation are reviewed alongside the techniques used to address these issues. Four community groups of participants are described (the Sierra Leonean group, the Latin American group, the Somali group and the Asian group) and the research process is mapped out. Issues of validity and reliability are addressed, followed by an account of the analytic techniques used to explore the collected data.

Chapter 4, 'The puzzle of participation: Structured limitations and personal choices' explores the first research question: how do social contexts influence non-participation in PES for people from socio-economically disadvantaged, minority ethnic groups? It explores the social contexts of participants' lives and the patterns of cultural participation they engaged with. In doing so, Chapter 4 investigates the influence of social positions such as gender, age, ethnicity and socio-economic status in combination with the effects of migration and transnational identities on participants' perspectives, and participants' involvement with two cultural specific fields; PES and community-based cultural activities. Chapter 4 presents an analysis of the relationships between participants' social positions and their non-participation in PES that is crucial for understanding PES participation in relation to the 'big picture' of participants' lives. Chapter 4 concludes with a discussion of how Bourdieu's concept of habitus can be used as a tool to understand how personal views and experiences mediate participation in cultural fields. The findings presented in Chapter 4 suggest that both habitus and structured limitations resulting from the relationships between the field of PES and participants' social positions, affect non-participation in PES.

Chapter 5, 'Dispositions and disidentification: Participants' views and experiences of science and PES', extends the analysis of social positions and habitus presented in Chapter 4 by exploring participants' attitudes towards science and PES in more detail. Chapter 5 addresses the second research question: what views and experiences do people from socio-economically disadvantaged, minority ethnic groups have of science and PES? The different ways in which participants did and did not relate to science and to engagement practices are explored. Throughout Chapter 5, the ways in which participants disidentified with science and with PES are mapped out, including accounts of participants who differed from most because they did identify with certain aspects of science. Chapter 5 closes with a more detailed discussion of habitus and of how participants developed dispositions against science and participation in PES.

Chapter 6, 'PES in practice: Accompanied visits to museums and science centres', presents an analysis of four visits to museums and science centres. Chapter 6 investigates the third research question: how do people from socio-economically disadvantaged, minority ethnic groups experience PES in practice? Four accompanied visits, one with each group, were carried out for this thesis. Unlike Chapters 4 and 5, the analysis presented in Chapter 6 uses a framework based on theories of learning in PES contexts to analyse the visits, before discussing the analysis in terms of the other theories drawn on in this thesis. The contextual model of learning developed by Falk and Dierking (2000) is adapted in Chapter 6 to account for inaccessibility as well as to explore whether and how learning occurred during the accompanied visits. The ways in which participants framed their visits are also examined to contextualise the visits from the participants' perspectives. Chapter 6 discusses how PES practice both offered and restricted learning opportunities for participants. While the potential for inclusive, cross-cultural meaning-making is outlined, Chapter 6 suggests exclusive and inaccessible elements are embedded in PES practice. Thus, participants' views about science and PES as 'not for us' are upheld by their experiences of PES practice, and their on-going experiences of structured exclusion as a result of their social positions.

Chapter 7, 'Discussion of findings and contributions to knowledge', relates the findings of the three data chapters to each other and the literature review, and outlines the contribution of this research to understanding non-participation in PES. The key findings of this study, discussed in Chapter 7, suggest that non-participation in PES is complicated and involves several factors; structured limitations to participation that result from the relationships between the field of PES and participants' social positions, participants' habitus and exclusive PES practices. Chapter 7 outlines the new contributions of this thesis to knowledge as an empirically based understanding of why and how non-participation in PES takes place and empirical and theoretical insights into the potential for more inclusive PES practices.

Finally, in Chapter 8, ‘Limitations, implications and directions for future research’, the limitations and implications of this study, as well as directions for future research based on the work in this study are suggested. The study’s methodological and theoretical limitations are outlined in terms of participant recruitment, attempts to follow a participatory approach, pragmatic constraints such as language issues and constraints associated with intersectional perspectives on research. Key implications of this study are suggested in Chapter 8. The implications of this study for PES practice are discussed first, and the implications for PES research and policy are then discussed in more detail. Based on the limitations and implications of this study, several directions for future research that might fruitfully develop elements of this study are outlined, and a brief afterword concludes this thesis.

## **Chapter 2: Perspectives on participation in public engagement with science: A review of the evidence**

### **2.1 Introduction**

This chapter explores existing perspectives on participation in PES, non-participation and what patterns of non-participation might signify. Relationships between science and society are increasingly managed via PES policies and activities in the UK. Such opportunities are not, however, accessible for everyone. The concepts underpinning PES focus explicitly on a democratic vision of science and society relationships, including open and equitable access to science (House of Lords, 2000). However, despite over a decade of social inclusion policies from the New Labour government influencing the cultural institutions involved in PES, research suggests that family groups and young people from White European, urban and middle class backgrounds form the majority of participants (Department for Culture Media and Sport, 2011b; Ipsos MORI, 2011). This chapter reviews the theories, policies and empirical research that form the background to this thesis.

In this chapter I suggest that PES institutions and practices are exclusive, resulting in patterns of participation that reflect the differences between the dominant and dominated groups of contemporary Britain. Thus, as a cultural field PES maintains and reproduces social inequality, by providing resources for some but not for others, such that existing social hierarchies are maintained. Although a great deal of research explores why people do participate in some PES activities, such as visiting museums, there is considerably less research on non-participation in PES. Existing research on PES focuses on who is involved, the nature of their participation and the impact such participation has on their lives, but is constrained by its inward focus. As Bourdieu and Passeron have noted, such research runs the risk of following the internal logic of a particular field, to “consider only those who are in the system at a given moment, excluding those who have been excluded from it” (1990, p. 159). Indeed, exploring participation in PES from the perspective of those who do not participate provides a different

and novel focus for research on science and society relationships, and the institutions, practices and concepts that are involved in such relationships.

I begin this chapter by examining the role of science and PES in British society and by describing different perspectives on the potential benefits and problems associated with PES, including the influence of social inclusion policies on PES concepts and the influence of such policies on practice. Theoretical perspectives on non-participation from the work of Bourdieu are combined with intersectional theories to develop a more complex understanding of non-participation in PES and the reproduction of social inequalities. Finally, existing empirical research on participation and non-participation in PES, is reviewed, as well as research in science education of relevance to this thesis. The chapter concludes with the research questions of this study.

### **2.1.1 Definitions**

This thesis is situated across several different areas of research with many ways of describing science, people and culture. For example, one area this thesis draws upon has been described as the cultural studies of science and technology (McNeil 2007), which in turn draws upon both cultural studies and science and technology studies. Rather than focusing on the practices of science within the scientific community as much research in science and technology studies has done, this thesis concentrates instead on the concepts and practices involved in PES from the perspective of those who are outside core PES publics. Museum studies and research on learning science in informal contexts are both drawn upon in this research to investigate PES as a form of cultural participation, and to explore what participation in PES might offer. Another area of research drawn on in this thesis is science education, more specifically, sociocultural studies of science education (Lemke, 2001; Shanahan & Nieswandt, 2011). This thesis draws, in particular, on research from sociocultural studies that explores how science education favours some students and disadvantages others. In addition, research concerned with cultural participation, migration studies and the reproduction of social inequalities is also involved in this thesis.



As a result of this mixture of research from different areas, the terms ‘science’, ‘publics’ and ‘culture’ will be briefly defined here for purposes of clarity. I acknowledge the diverse and multiple forms that science takes in contemporary society and the complicated relationships between science and technology. In an attempt to encompass the different approaches that discuss, for example, science (Ziman, 2002), technoscience (Haraway, 1997; Michael, 2006) and science and technology (Burchell, 2007; House of Lords, 2000), although I do not wish to reify science as an entity with agency, I will refer to ‘science’ in the singular for the sake of simplicity. The concept of publics will, in contrast, be treated as plural in this thesis, following the more complex perspectives of publics developed by research in science and technology studies (Irwin, 1995), and the specific focus of this thesis on particular publics. The publics this thesis focuses on are those who do not participate in PES. Due, however, to the tensions inherent in constructing publics as included or excluded, I refer here to non-participants rather than excluded groups, and non-participation rather than exclusion. I refer to non-participation principally to highlight some consideration of agency for non-participants who may choose not to participate in PES.

It is also worth noting that culture can be considered fluid and that differentiation between cultures can be difficult (Bhabha, 1994, 1996). In this sense, I realise that differentiating in an essentialist fashion between ‘British’ culture and ‘other’ cultures, or ‘high’ and ‘low’ culture is problematic. In this chapter I argue that participation in science can be considered a key cultural practice in Britain. I draw on the concept of culture as collections of shared meaning, language, practices, values, politics, religion and so on, as described by Jenkins (1997). In particular, based on this broad view of culture, I use Bourdieu’s concept of field, described in more detail in section 2.3.1, to explore in more detail specific aspects of culture and cultural practices, particularly PES, which, in this thesis I consider to be a cultural field.

## **2.2 The roles of PES: Perspectives from research and policy**

To explore non-participation in PES it is important first to understand the role of science in British society and where PES fits within science and society

relationships. The importance of science to contemporary life in Britain is frequently referred to in policy documents, academic studies and the media. Relationships between science and publics are structured in numerous ways in Britain: through science communication practices, science education in schools and informal science learning contexts such as museums and science centres, by political organisations including governments and lobbying bodies associated with science and by the media. However, while PES practices are a key site of negotiation for relationships between publics and science, PES sits within a broader landscape of science and society issues. While this landscape is too broad to review in full, salient features of the role of science and PES in British society include the pervasiveness of science and technology, the association of science and technology with risk, the problems of expert-led decision making and the role of science and technology in the economy, culture and education.

Sociologists of science have studied the ubiquity of science and technology in daily life (Michael, 2006). Science, in terms of its pervasiveness and potential for damage, is also increasingly viewed in terms of risk, whether as environmental damage, nuclear disaster or food contamination (Beck, 1992; Giddens, 1990; Ravetz, 2005). That science is inextricably involved in contemporary British life and possesses unknowable yet potentially disastrous risks, called into question the expertise and decision making powers of those involved in science and science-related politics. Growing public concern over the course of the twentieth century resulted in calls for science and the governance of science to be opened up for public scrutiny and participation (Fiorino, 1990; Gregory & Miller, 1998; Nelkin, 1995; Wynne, 2006).

In political grey literatures, including ministerial speeches, policies and published government budgets, science has been, and continues to be, positioned as playing a crucial role in the UK economy and the global competitiveness of British industries. Threats to the legitimacy and status of science resulting from public mistrust were, understandably, taken seriously by government. For example, after the genetically modified organism (GMO) debates of the 1990s, Monsanto, the company involved in the development of GMO products, withdrew from the UK

market as a result of public protests and the development of GMOs in UK agriculture ground to a halt. Decisions about GMO research were then made the subject of a national public participation exercise by the New Labour government (Gregory, Agar, Lock, & Harris, 2007; Rowe, Horlick-Jones, Walls, & Pidgeon, 2005).

Successive British governments have positioned science as essential for economic growth, in both straight forward market terms, and in terms of international educational rankings like the PISA results<sup>1</sup>, which are seen as predictors of future innovation and, therefore, economic success. The links between educational success in science subjects and economic growth have been questioned (Drori, 2004; Osborne, 2007; Schofer, Ramírez, & Meyer, 2000). However, arguments such as the need to learn science for everyday survival in a world saturated with science, and the need to learn science as the basis for future economic prosperity, continue to drive how science and society relationships and PES are structured from a government perspective. For example, both the New Labour government and the subsequent Conservative-Liberal Democrat Coalition government seemed to hope one outcome of government funding for British science centres would be an increase in science student recruitment and scientific literacy across the UK population (Frontier Economics, 2009; Ipsos MORI, 2011).

While participation in science through political consultations, the workforce and education have been important to consecutive British governments, other arguments for improving relationships between science and society exist. Arguments have been made about science as a core part of British culture, an aspect of culture as beautiful as music and as valuable as any other aspect of British heritage (Farmelo, 2009; Featherstone, Wilkinson, & Bultitude, 2009; Ziman, 2002). Educationalists have argued that given the ubiquity and cultural significance of science, science education ought to be a core part of what people learn in and out of school (Dillon, 2009; Osborne, 2007; Osborne & Dillon, 2007,

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<sup>1</sup> The Programme for International Student Assessment (PISA) is organised by the OECD. In their words it “is an internationally standardised assessment that was jointly developed by participating economies and administered to 15-year-olds in schools” (OECD, accessed 23.9.11. ).

2008). While science became a core curriculum subject for British schools in 1989, and in this sense compulsory for most students (The Parliamentary Office of Science and Technology, 2003), learning science outside school systems constitutes a growing form of cultural participation, also referred to under the banner of PES. Such learning takes place in museums, science centres, science festivals, botanic gardens, zoos and aquaria, university out-reach and in-reach programmes, to name but a few of what are sometimes referred to as “informal contexts” for science learning (Osborne & Dillon, 2007, p. 1441).

Research has also suggested that while engagement with science through cultural activities, education and employment may be rewarding for some, access to science in these ways is not equally available for everyone. Research has shown that women, people from minority ethnic backgrounds and people from disadvantaged socio-economic backgrounds are less able to access certain aspects of science. For example, such groups are underrepresented in science education, the scientific workforce and in political decision making around science (Haraway, 1997; Harding, 2006, 2008; Rose, 1994; Rose & Rose, 1969). Sociologists of science have argued that science is a social activity, embedded in a society with power relationships, divisions and biases (Longino, 1990). As such, sociologists have questioned the roles played by science in society and the extent to which science has been used to privilege some groups instead of others (Gilbert & Mulkay, 1984; Latour, 1987; McNeil, 2007). The sociology of science is an area too large and complex to do justice to here; suffice it to say that science, and the ideological positions sometimes connected with it, has been associated with the perpetuation of certain social inequalities.

It is within these complex and different science and society relationships that PES is situated. If access to science, whether in everyday life, as part of politics, the workforce, the economy, culture, the education system or PES is denied, made difficult or seems undesirable, those who are not involved are left out of an important part of contemporary British society.

### 2.2.1 The development of PES: Policy, research and practice

Describing public engagement with science, or PES, is not straightforward. As might be expected given the many roles of science in contemporary Britain, the term ‘PES’ is used in more than one way. The prevailing story of the development of the field of science communication, within which PES is situated, has received much discussion (see Gregory *et al.*, 2007; Miller, 2001; Wynne, 2006). An abbreviated explanation in the UK context might contain the following key points.

Science communication in the 1980s was based on one-way communication to the public. This approach was premised on “research indicating the widespread scientific ignorance in the general populace” (Osborne, Simon, & Collins, 2003, p. 1049) and the perceived need to redress such ignorance. This approach came to be known in the literature as the Public Understanding of Science (PUS) movement. As highlighted by science and technology studies scholars, the PUS model was based on a deficit framework that positioned the public as a homogenous mass, largely uninformed about science (Irwin & Wynne, 1996; Wynne, 1992). The PUS model implied that if sufficiently exposed to science, the public would both absorb and learn to appreciate science.

The deficit framework was widely criticised for positioning science as an unadulterated good, which would be duly appreciated by an ignorant public upon their involvement in a suitable intervention. PUS was also criticised for ignoring the heterogeneous nature of the ‘publics’ (Irwin & Wynne, 1996; Michael, 2002). A shift towards ‘engagement’ emerged from these critiques and was positioned as a more equitable way to frame relationships between publics, scientists and, in addition, policy makers. As a result, a participatory ‘engagement’ model to communicate ‘with’ multiple ‘publics’ was developed within science communication. This shift can be seen in the differences between two policy documents. The Royal Society report, *The Public Understanding of Science* (1985)— known as the Bodmer report — triggered the PUS movement. Later, the House of Lords *Science and Society* report (2000) pushed forward public ‘engagement’ with science. Thus, by 2001 Miller referred to the emergence of

PES as a “3-D” model of science communication, a model based on discussion, debate and dialogue (2001, p. 117).

This is a tale of progress, where an expert-led model that informed the public about science was reborn as a democratic, participatory model for the co-construction of science and society relationships (Bauer, Allum, & Miller, 2007). This account of the development of PES has, however, been questioned. PES exercises have been criticised for the continued presence of deficit orientations that typified the PUS movement in science communication (see for example, Felt & Fochler, 2008; Kurath & Gisler, 2009). Empirical studies have suggested that the PUS model remains a key part of the way PES professionals see their work (Burchell, Franklin, & Holden, 2009; Kurath & Gisler, 2009; Wilkinson, Bultitude, & Dawson, 2011). The continued use of the deficit framework also runs counter to considerable research in science and technology studies. Research suggests that public groups use their own knowledge when dealing with scientific issues, in ways that showed they were far from deficient (Irwin & Michael, 2003; Layton, 1993; Marres, 2005). The enduring presence of the deficit framework, in both PES exercises and the accounts of practitioners, contradicts the democratic ideals of PES and maintains a problematic view of publics as largely ignorant, lacking in both awareness of, and appreciation for, science. This suggests that in some cases contemporary PES practice may owe more to the PUS model than anything else.

In practice, therefore, PES appears to draw on a mixture of concepts, including those of deficit and democracy. Given the mixed and at times contradictory conceptual background of PES, PES practice in the UK is diverse. ‘Public engagement’ is a phrase so broad in meaning that it has become an umbrella term, under which multiple motivations, activities and ideologies co-exist across a range of institutions. Mapping exercises of PES have distinguished two broad branches of practice in the UK; firstly, activities and events concerned with science policy and decision making, and secondly, activities oriented towards cultural participation where social and educational outcomes are prioritised, such as learning science in informal contexts like science centres or museums (Bucchi

& Neresini, 2007; Edwards, 2004; Rowe & Frewer, 2005). Political consultations as well as PES exercises designed to ‘inform’ rather than lead policy development can be considered part of the first branch. Science festivals, exhibitions and events programmes in informal science learning contexts such as science centres, as well as after school science-clubs can be seen as part of the second branch.

At present in the UK a range of organisations are involved with PES, employing a number of techniques, ranging from the didactic to the deliberative, from activities that aim to teach science, to those that help participants to question science. These organisations include, amongst others, national and local government departments, museums, charities, universities, cafés and pubs, businesses, science centres, festivals, learned societies and botanic gardens (Davies, McCallie, Simonsson, Lehr, & Duensing, 2009; Featherstone *et al.*, 2009; Mesure, 2007; Trench, 2008). However, despite attempts to categorise PES exercises, distinguishing between them remains difficult due to the overlapping nature of the concepts and practices involved. For example, political consultations, science ‘busking’, hands-on science discovery activities and lectures can all be found at the same science festival or science museum and may draw on the same concepts and ideals, as well as similar practical techniques (McCallie *et al.*, 2009). Thus, PES practitioners may simultaneously draw on motivations to teach people, to entertain them, to market science and to involve people in the governance of science.

### **2.2.2 Relationships between science and society: The benefits and disadvantages of PES**

Given the role of science in contemporary British life, opportunities to engage with the political, educational, social and cultural aspects of science via PES are often understood as valuable. Research suggests that at best, participation in PES provides people with the chance to learn, to develop their skills and scientific literacy, and to enjoy themselves (Benneworth, 2009; Falk & Needham, 2011). In political terms, participation in decision making on scientific issues can give members of the public a voice in such decisions and, it is argued, provides more

robust, more legitimate decisions (Horlick-Jones, Rowe, & Walls, 2007; Wilsdon & Willis, 2004). The extent to which this is possible, given the different levels of information and power available to participants in such settings, has been open to debate (Rowe *et al.*, 2005; Tlili & Dawson, 2010). It remains the case, however, that participation, at the least, provides the potential for public involvement in political decision making, which, when successful, is a significant form of empowerment for participants.

Research on the value of PES beyond explicitly political contexts suggests the benefits of participation in PES for members of the public include learning new concepts or strengthening understanding of existing knowledge, interacting with scientists, enjoyment and social benefits such as spending time with friends and family (Rennie & Stocklmayer, 2003; Wilkinson, Dawson, & Bultitude, 2011). It has also been argued that access to political voice hinges upon access to education and equitable participation in society (Freire, 1998; hooks, 1994). In this respect, the educational, cultural and social advantages offered by PES opportunities can be considered as politically valuable as forms of PES which offer direct political participation (Davies *et al.*, 2009).

PES experiences in educational, cultural and social contexts have been examined from a number of other perspectives. For example, museum and science centre experiences have been explored in terms of performativity and conversation analysis (Heath, Lehn, & Osborne, 2005; Meisner *et al.*, 2007), using encoding/decoding concepts drawn from media theory (Dicks, 2000; Macdonald, 2002) or aspects of different identity theories (Falk, 2009; Rahm & Ash, 2008). Much of this research comes from the field of Museum Studies as well as a more specific area within that field often referred to as 'Visitor Studies' because of the nature of the participants involved. While specific approaches to researching participant experiences may differ, an underlying rationale about such experiences as occasions for learning persists, often drawing broadly on social constructivist theories of learning. Visits to museums and science centres are also often positioned as educational by the organisations themselves (Ecsite-UK, 2008; Hein, 1998). As a result such visits are typically framed in the literature



and in practice as offering opportunities for learning science (see for example, Falk & Dierking, 2000; Mortensen, 2011; Packer & Ballantyne, 2002; Stocklmayer, Rennie, & Gilbert, 2010).

The emphasis on learning has led to PES participation being positioned as an educational intervention with measurable outcomes, especially within the second branch of PES practice which is more oriented towards cultural participation with educational and social goals. This kind of research has been described variously as the “conveyor-belt model” (Macdonald, 2002, p. 219; see also Sandell, 2007, p. 10) or the “classroom-as-container” model (Leander, Phillips, & Taylor, 2010, p. 332). However, as Dewey argued in 1938, “The belief that all genuine education comes about through experience does not mean that all experiences are genuinely or equally educative” (Dewey, 1938, p. 13; see also Hein, 1998). In other words, learning is not the inevitable outcome of a PES experience. The ‘PES experience as measurable learning opportunity’ model also runs counter to research that suggests learning takes place over time and in multiple, overlapping settings (Lemke, 2000; Rahm, 2004; Wortham, 2008). While the extent to which PES activities provide learning opportunities has been questioned (Macdonald, 2002), learning continues to be an important concept in the way PES is understood and a key dimension of the negotiation of science and society relationships through PES activities.

PES policies and practices can also be understood to reinforce which cultural practices matter. Government policies related to PES have highlighted the importance of understanding science as an important part of British culture, related to the requirements of citizenship. For example, the *Science and Society* report stated that “democratic citizenship in a modern society depends, among other things, on the ability of citizens to comprehend, criticise and use scientific ideas and claims”, and argued that science centres and museums, not to mention the many other forms of PES, were valuable resources for the British population (House of Lords, 2000, para.1.11) . A more recent report from the government’s Science for All Expert Group argued similarly for a “vision of all sections of society valuing the sciences” (2010, p. 6). In other words, engagement with

science via PES activities has been seen as an important and legitimate form of cultural participation.

The positioning of PES as a significant cultural activity within British society is salient because cultural practices play important roles. For example, Bourdieu's (1990) work on cultural participation focused on what kinds of culture counted within a society. Bourdieu concentrated on the cultural practices of the dominant groups (the upper and middle classes) in French society in the late twentieth century. His work suggested that cultural institutions define both what kinds of culture are important and which publics can access this culture, and are therefore, themselves important. From a more critical perspective, PES practices have been considered to delineate what and who 'counts' in terms of science and publics. In other words, science festivals, centres or botanic gardens frame which parts of science are important, and, which parts ought to be publically available or discussed. As Macdonald has argued: "one effect of science museums is to pronounce certain practices and artefacts as belonging to the proper realm of 'science', and as being science that an educated public ought to know about" (1998, p. 2). PES opportunities therefore frame both science, as well as the 'educated public'.

The work of Bourdieu (1984; 1990) and other education and museum studies researchers (Fleming, 2002; Reay, 2004) suggests that cultural institutions can be exclusive, and their benefits only partially 'public'. Such suggestions undermine the democratic principles drawn on in the development of PES; that political legitimacy requires equitable discussions with publics on scientific issues and decision making (Science and Trust Expert Group, 2010; Wilsdon & Willis, 2004). From this perspective, patterns of non-participation in PES are more important than individual choices about whether to visit a science centre or the cinema. Non-participation not only calls PES practices and ideals into question, but those who do not participate in PES do not access the potential political, educational and social benefits PES activities are thought to offer. Disadvantages of this nature are powerful, and may perpetuate significant inequalities in British society. Consequently, as the work of Bourdieu (1984; 1990; 1990) and others

(Fleming, 2002; Lynch, 2001, 2011) suggests, participation in PES may reproduce social inequalities through apparently open access that actually favours those with the skills to negotiate and understand such practices. This is in contrast to the two PES policy documents referred to above that explicitly suggest science and PES are for everyone.

Therefore, on the one hand, PES opportunities seem to offer much to those who participate, conferring advantages in terms of political voice, learning and social opportunities, while, on the other hand, those who do not participate miss out on such advantages. For that reason it is important to understand more about how non-participation is framed within PES, as well as from a broader, theoretical perspective. It is also crucial to examine the patterns of non-participation in PES and to explore beyond the terrain of museum learning.

### **2.2.3 The influence of social exclusion policies on PES**

Social exclusion from cultural participation has featured prominently on the political agenda in the UK in the last 15 years. The influence of social exclusion/inclusion policies on how non-participation in PES is understood has not, however, been straightforward. The social exclusion/inclusion policies of the New Labour government made the issue of participation a pertinent one for the field of PES, especially for the publically-funded museum sector. The policy term ‘social exclusion’ was borrowed from European Union policies and reiterated in a British context by the New Labour government. Definitions of social exclusion varied however, even within New Labour policies, such that the term became contested soon after its adoption (Burchardt, Le Grand, & Piachaud, 1999). Two versions of social exclusion can be identified within New Labour policies that relate to this study. The first involves models of social exclusion that have been primarily concerned with poverty and redistributive policies, while the second focuses on a more ‘cultural’ understanding of social exclusion/inclusion.

The version of social exclusion that concentrated on economic concerns, though on-going, can be seen as an early form of social exclusion in British policy discourses (Levitas, 1998). In this version measurements of exclusion focused on

economic indicators, sometimes linked to the impact of poverty on education and health. This way of framing social exclusion has been exemplified in the Rowntree Trust reports (for example, Howarth, Kenway, Palmer, & Miorelli, 1999; Parekh, MacInnes, & Kenway, 2010), as well as research from the Centre for Analysis of Social Exclusion at the London School of Economics (for example, Dickens & McKnight, 2008; Rigg, 2005). This version of social exclusion prioritised the economic aspects of exclusion, whether they were related to employment or inherited, as the principal drivers of exclusion. While this view of social exclusion persists, it was superseded in policy discussions of cultural participation by a second version of social exclusion; one concerned with the redistribution of culture rather than money.

This second way of framing social exclusion saw cultural participation as a means of addressing larger social inequalities. Thus, visits to art galleries or science museums, and the potential political, educational and social benefits offered by such experiences, were thought to promote social equality beyond the visit experience. Participation in cultural practices was thought to help people from marginalised social groups develop skills that might alleviate experiences of classed, ethnic or gendered marginalisation. Benefits of the ‘cultural’ view of social exclusion included an explicit recognition of the role institutions like museums could play in perpetuating or addressing patterns of social exclusion, and broad agreement that such institutions should, and indeed must, work to counteract their exclusive practices (Sandell, 1998; Tlili, Gewirtz, & Cribb, 2007).

The second perspective on social exclusion influenced the development of social inclusion agendas and projects within the field of PES, although typically within publically funded institutions such as museums. This resulted in institutional policies about ‘widening participation’, ‘outreach’, and ‘community engagement’ in museums, science centres, universities and other organisations involved with PES. For example, people from minority ethnic groups have been targeted through projects developed to appeal to specific excluded groups, such as Bangladeshi women’s groups or inner city students from diverse backgrounds

(Foggett, 2008; Hooper-Greenhill *et al.*, 2007). While evaluating specific social inclusion projects in the field of PES is beyond the scope of this review, it is relevant to note two issues. Firstly, thus far, inclusion projects appear to have made little difference to the on-going patterns of participation in PES (see section 2.4) and secondly, ‘inclusion’ projects have sometimes been problematic in ways that are relevant for this study. For example, tensions have been noted in the different ways social exclusion/inclusion policies have been interpreted by those involved with PES practices (Tlili, 2008).

One key way in which PES institutions and practitioners have sought to redress the uneven balance of PES participants has been via projects targeted at specific groups of non-participants. On the one hand, such projects are a practical and achievable way for a PES institution to start to address issues of social inequality and access to PES by actively encouraging and helping certain groups to participate. On the other hand, by focusing on specific groups through specific projects, this approach to inclusion may obscure exclusive tendencies within the rest of PES practice, and also risks positioning non-participants, rather than PES practices, as at fault. As Yosso has argued, with regards the cultural norms governing education systems, the prevailing institutional view is “that students, parents and community need to change to conform to this already effective and equitable system” (2005, p. 75). This critique can be applied to PES and suggests that while targeted social inclusion projects may provide a more socially inclusive platform for PES participation in some cases, but they also risk perpetuating exclusive PES practices by focusing on non-participants rather than PES practices.

Social inclusion practices that only focus on targeting non-participants have been described as taking an assimilationist view of inclusive PES practice (Fenichel & Schweingruber, 2010; National Research Council, 2009). The assimilationist view suggests that non-participants simply lack experience of existing PES activities as a result of barriers to participation. From this perspective it is non-participants and ‘barriers’ to PES participation, rather than potentially exclusive tendencies within PES practices, that are at fault (National Research Council,

2009). Thus, the assimilationist perspective suggests that if access to PES could be improved through outreach to schools in socio-economically deprived areas, or via a reduction in the cost of museum visiting, those who currently do not participate would begin to do so. This perspective does not see PES practices as potentially off-putting or exclusive. The assimilationist perspective has been critiqued for assuming PES, as it is currently structured, is inherently valuable to all groups within society. Some argue that the assimilationist view overlooks the role PES plays in dominant cultural practices, and that, as such, it has been developed by, and is better suited to, dominant rather than non-dominant groups (Fenichel & Schweingruber, 2010; National Research Council, 2009).

The major issue with the assimilationist perspective and the targeting of specific groups for inclusion projects is that it does not appear to have improved access to PES. For example, the removal of entrance fees from the National Museums in the UK resulted in more visits to such museums, but not necessarily by a more diverse set of visitors (Ipsos MORI, 2003). Indeed, the most recent data published by the Department for Culture, Media and Sport shows a decrease in the number of visitors to free national museums from lower socio-economic groups (Department for Culture Media and Sport, 2011a). This suggests that understanding non-participation as the result of straightforward barriers like entrance fees does not sufficiently explain why some people do not participate in PES. It is, of course, worth noting that widespread institutional change is difficult, however non-participation remains a significant issue for PES. Through a limited or incorrect understanding of non-participation, approaches to inclusion like the assimilationist perspective risk developing PES practices that fail in their remit to encourage participation from a broader range of social groups, and may limit the extent to which inclusive PES practices can be developed.

### **2.3 Theoretical perspectives on non-participation in PES**

A more complicated but potentially more useful way to understand non-participation in PES can be developed from the application of the work of Bourdieu on the relationships between cultural practices and social positions, augmented by perspectives from intersectional theories. These theoretical

perspectives can be combined into a framework for understanding how non-participation in PES may result from and contribute to broader patterns of social inequality.

Bourdieu's work on cultural practices in France suggests that practices such as museum visiting or studying at university mediate and reproduce existing social relations, limiting social mobility and perpetuating differences between social groups. For example, in their work on the role of the education system in France, Bourdieu and Passeron argued that participation in education was marked by social class in ways that perpetuated social inequalities (1990). They argued that working class students participated less in certain branches of the education system because they choose not to pursue certain subjects, certain levels of qualification and places at certain, more prestigious, institutions. Bourdieu and Passeron argued that the way the education system was structured meant educational success was difficult for working class students to achieve, since the system rested on and valorised the knowledge and practices of the empowered (upper and middle) classes. As a result, working class students saw certain education practices, for instance, higher education, as "not for the likes of us" (Bourdieu & Passeron, 1990, p. 157). Thus in response to a system in which neither they nor their peers could succeed, working class students became disposed to not participate in certain educational practices.

Thus, participation in a given field, whether the school system, or, in the case of this thesis in PES, may rest upon how that system is structured and the dispositions (or habitus, to use Bourdieu's term) of those who engage with that field. For Bourdieu and Passeron the school system was able to disguise classed practices of selection by seemingly open entrance arrangements and apparently meritocratic reward structures, which actually maintained and legitimated the existing social order. That such practices obscure the reproduction of classed inequalities, what Bourdieu termed symbolic violence (1991), is at the heart of their power. Thus, the school system facilitates "the reproduction of the established order, since it succeeds better than ever in concealing the function it performs" (Bourdieu & Passeron, 1990, p. 167). This perspective can be applied

to PES. For example, the way PES is structured, including barriers to access such as entrance fees as well as other potentially exclusive PES practices, may affect non-participants' attitudes towards PES such that they become disinclined to participate. Bourdieu's work provides, therefore, some useful concepts for this study of non-participation in PES and suggests a more complicated, but potentially more useful way of understanding why and how some people do not participate in PES. Three theoretical tools developed by Bourdieu, field, capital and habitus, are used in this thesis and are outlined below.

### **2.3.1 Bourdieu: Field, capital and habitus**

PES can be understood as a field, drawing on Bourdieu's concept of field which he described as a "social universe having its own laws of functioning" (1993, p. 14). The relational universe of a cultural field, for Bourdieu, is comprised of the social positions of institutions and individuals and their possibilities within that field, and is, as a result, fluid. The concept of field refers to the social contexts participants inhabit; in other words, the different social spaces of their lives. Fields involved in this study would include, for example, the field of PES, the field of academia, as well as participants' own fields of employment, religious practice and so on. Each of these fields has its own values, or rules, and these serve to differentiate one field from the next.

For the purposes of this thesis PES will be understood as a cultural field, encompassing political, educational and social elements, and taking place in a variety of settings including, but not limited to, science centres, museums, festivals, national and local government settings, zoos and aquaria. The social positions and possibilities available within the field of PES are many, but include for example, the practitioner, the participant, and, importantly for the focus of this thesis, those outside the field, the excluded.

For Bourdieu, fields relate to other fields. For example, the field of PES is closely related to that of science education, sharing aspects of the same political agendas, funding bodies and participants. It could be therefore expected that an individual with capital in the field of science education would be able to use that capital in



the field of PES. The theoretical tool of field also enables PES to be situated within broader social fields, for instance, those of class relations or transnational relationships. This means that the field of PES can be explored in relation to the other fields involved in people's lives, allowing links between employment, available leisure time and non-participation in PES to be explored. The forms of capital available, used, accrued and lost in one field can relate to those forms of capital which exist in a related field. As Bourdieu puts it, "a capital does not exist and function except in relation to a field" (1992, p. 101). Relationships within and between fields are managed, therefore, by the participants' ability to use or generate different forms of capital.

Forms of capital, such as economic capital, cultural capital and social capital, function to determine a person's position within a field. Capital can operate between fields to increase (or decrease) a participant's position in a related field. The example frequently used is that of the relationship between increased cultural capital as the result of time spent in educational institutions, legitimated by certificates, which can be exchanged for higher economic capital in the form of better employment opportunities (Bourdieu & Passeron, 1990). Thus, in the case of participation in the field of PES, cultural capital developed via visits to science centres as a child might translate into cultural capital in the field of science education. For example, certain elements of scientific content knowledge as well as particular learning practices like asking questions might provide a foundation from which a student could build cultural capital in the field of science education. However, such processes are far from clear-cut and little is known about how they might operate empirically.

The concept of habitus is the third theoretical tool I have borrowed from Bourdieu. Habitus also affects how people manage their positions in different fields and negotiate between different forms of capital. Habitus is the result of exposure to certain fields, such that a person learns how to behave in different situations, how to speak, dress or eat appropriately, as well as how to live. Thus, a person's habitus structures their behaviours, assumptions and lifestyle. For Bourdieu, habitus is the bridge between the choices people make, the fields they

inhabit and the capital they possess. It is the “disposition that generates meaningful practices and meaning-giving interpretation”(1984, p. 166). Because habitus is constructed from experience, it can also be understood as something that is itself structured. For Bourdieu, therefore, habitus is both a “structuring structure” and a “structured structure” (1984, p. 166). Habitus is a concept that enables relationships to be explored between people’s experiences and attitudes, and links the effects of structures, such as institutional inequalities, with the choices people make.

Through habitus, experiences of disenfranchisement can be mirrored in “different sets of dispositions with regard the social games that are held to be crucial to society” (Bourdieu & Wacquant, 1992, p. 172). Since habitus is structured by experience, Bourdieu argues that patterns of habitus can be discerned within social groups whose experiences may be shared. Therefore, for Bourdieu, the conceptual art museum was the preserve of the upper classes and would only ever have a limited appeal to working class people (1984). If this is the case with an art gallery, to what extent is this also the case for participation in PES?

Bourdieu relates these three constructs together in an equation as follows; “[habitus) (capital) ] + field = practice” (1984, p. 101). In this way, Bourdieu argues that practice results from the relationships between habitus and capital within a specific field. If knowledge about science is considered ‘crucial to society’ as suggested by policy documents like the House of Lords *Science and Society* report (2000), participation in PES can be understood as an important social ‘game’. Applying Bourdieu’s work to PES suggests that whether or not people participate in PES may result from the relationships between field, capital, habitus and practice. For example, how the field of PES is structured, where PES fits in relation to other fields involved in people’s lives, what attitudes people have towards PES participation and what happens in PES practice. Thus, exploring PES practices and the way PES is structured as a field as well as participants’ social positions in relation to the field of PES and their habitus might provide a useful way to understand non-participation in PES.

### 2.3.2 Beyond Bourdieu: Identities, social positions and intersectional theories

Although the theoretical tools developed by Bourdieu provide useful ways to think about non-participation in PES, they are, as others have noted, limited by a focus on class, or socio-economic position (Bennett *et al.*, 2009; J. R. Hall, 1992). Bourdieu's work has been adapted by other researchers to take into account more complex views of the relationships between class and other aspects of identity, sometimes described as social positions such as ethnicity and gender; as Skeggs suggests "class cannot be made alone, without all the other classifications that accompany it" (2004, p. 3). Research that focuses on the relationships between multiple social positions and social inequality is sometimes referred to as intersectional. Intersectional theories highlight the complexity of issues involved in patterns of disenfranchisement and argue that forms of oppression cannot be reduced to one social position or key issue, such as socio-economic position (P. H. Collins, 2000).

A combination of intersectional approaches and Bourdieu's theories have been used to explore the relationships between cultural consumption, ethnicity, age and class (Bennett *et al.*, 2009; Trienekens, 2002), gender and education (Dumais, 2002; Mickelson, 2003), and the relationships between gender, ethnicity, class and education (Reay, 1998). As Gayo-Cal has argued "if one wants to understand why people exhibit particular patterns concerning leisure, Bourdieu's approach is still useful, but other factors [...] like age, ethnicity and gender, also need to be considered" (2006, p. 187). In addition, without drawing on Bourdieu, theorists like hooks (1994), Harding (2008), Young (1990a) and Yosso (2005), have explicitly linked cultural participation to issues of identity and social position, in particular, ethnicity, gender, class and the reproduction of social inequalities.

Theories about social positions such as gender, ethnicity and class, and their role in identity development, are contested and come with their own tensions and histories (Skeggs, 1997). Such concepts are, however, highlighted again and again as crucial factors in research on educational, political and cultural participation (Bourdieu, 1984; Bowles & Gintis, 1976; Shanahan, 2009; Young, 1990a). The theoretical perspectives sketched briefly above suggest that non-

participation in PES is not a one dimensional issue. Paying attention to the overlaps between social positions may be an important part of understanding non-participation in PES.

Differences in how concepts such as gender and ethnicity are theoretically framed produce different implications for carrying out research. For example, anti-essentialist perspectives suggest instead that class, or socio-economic positions shift and cannot be adequately explained with numbered categories (Lucas & Beresford, 2010). Such theories question the validity of measures like the numbered and lettered systems frequently used by government statistics, based on cross referencing post-codes, with levels of education, employment and so on<sup>2</sup>. Ethnicity and gender are similarly contested. Anti-essentialist theories of class, ethnicity and gender argue that identities are fluid and cannot be fixed, whether as a particular, anatomic conceptualisation of gender or ethnicity/race. For example, essentialist views of ethnicity as a biological characteristic, often described as ‘race’, contrast with anti-essentialist theories of ethnicity which focus on the cultural practices of groups, like shared languages and religions (Bhabha, 1994; S. Hall, 1996; Jenkins, 1997). Similarly, following the work of Butler (2006) and Young (1990b) gender has been understood as a relational construct, and like ethnicity, not fixed in biological characteristics, but created via a mixture of social and cultural practices.

Understanding ethnicity, gender and socio-economic position is further complicated by the relationships between them. In the case of people from minority ethnic groups, for instance, migration studies have shown how socio-economic position not only shifts as a result of migration, but how migration can produce multiple socio-economic positions for the same individual, albeit in different national contexts (Rouse, 1992; Vertovec, 2004). For instance, Erel’s (2010) research used Bourdieu’s concept of capital to show how Turkish migrants in Germany recreated new relationships between their gender, ethnicity and socio-economic positions through the process of migration, in particular,

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<sup>2</sup> For example, Ipsos Mori research commissioned by government categorised people who did not engage with science activities as coming from socio-economic group “C2DE” (Ipsos MORI, 2011). These are the lower socio-economic groups according to this method of categorisation.

simultaneously occupying different socio-economic positions in different national contexts. Similarly, researchers like Modood (2010) have highlighted both the enduring nature of Muslim ethnic identities and the flexibility with which Muslims in Britain develop hybrid identities as British Muslims. Thus, studies suggest that for people from minority ethnic groups, migration creates new and different relationships between socio-economic position, ethnicity, gender and other issues. The conundrum at the heart of these different and fluid perspectives of ethnicity, gender and socio-economic position, lies in how to understand the durable yet fluid nature of these aspects of people's lives.

I use the work of Holland *et al.* (2001) on identity in practice to consider socio-economic position, ethnicity and gender as social positions, amongst many others, including for example age and sexuality, which can be considered as aspects of identity. Holland *et al.* provide a useful bridge between the anti-essentialist theories of identity developed by Butler (2006), Hall (1996) and Bhabha (1994), and the work of Bourdieu (1984) on the ways in which social positions influence access to opportunities in society. These perspectives are drawn on by Holland *et al.* (2001) to describe social positions as relationally constructed through practice, and as a result, subject to change.

Social positions can be understood as an important part of people's lives and identities that endure, but are not rendered immobile or narrowly defined, for example, as biological or geographic characteristics. Holland *et al.* (2001) relate social positions to identity practices in social life, and emphasise the durable characteristics of social positions in societies where such positions are created, recreated and structured through practices of domination and status. As a result, Bourdieu's theoretical framework of field, capital, habitus and practice can be seen as in keeping with that of Holland *et al.* (2001), since it maintains the possibility of flexibility and change whilst simultaneously providing a framework for exploring the ways in which social positions are durable.

What that means for this thesis is that I acknowledge both the fluidity of relationships between identity, social positions, and life in contemporary Britain.

Therefore, this exploration of non-participation in PES draws on the concepts of class, gender and ethnicity, but treats these categories as complicated and not necessarily stable, enabling this research to explore such categories in a flexible manner.

## **2.4 Research on participation and non-participation in PES**

The majority of research on PES focuses on those who do participate and what benefits participation in PES may provide for them. In contrast, why and how patterns of non-participation in PES exist and persist is less established, a concern raised by others in the UK (The Association for Science and Discovery Centres, 2010; Wellcome Trust, 2008), and echoed in the US (National Research Council, 2009). Indeed, patterns of non-participation are themselves not clearly established in research and have to be inferred by examining the available data on who does participate.

While not all of the sectors involved in PES in the UK collect data on their participants, patterns of participation can be gleaned from government research and research from science centres and museums. According to the 2011 report from the Department of Business, Innovation and Skills (BIS), “in the past 12 months, half the public (50%) have engaged in at least one of the science activities asked about in the survey” (Ipsos MORI, p. 19). The science activities the study asked about were science talks and activities outside of school or university classes, visits to science centres, science museums, zoos, planetariums and science festivals, with museums and zoos ranked as the most popular. The popularity of science activities was backed up by data from the British science centres network<sup>3</sup>, which showed that science centres were visited more than libraries, art galleries or theatres in 2005-6 (Ecsite-UK, 2008).

The Ecsite report found that “a fifth of the population said they have visited a science museum or science centre in the 12 months prior to the survey and a quarter had visited a zoo”(Ecsite-UK, 2008, p. 9). This fifth of the population was

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<sup>3</sup> Currently known as the Association for Science and Discovery Centres (ASDC), formerly Ecsite-UK and still part of the larger Ecsite network of European science centres and museums.

more than half female, comprised of large numbers of young people, those visiting with their school (17.3% for the nine millennium funded science centres, and 10.6% for the six nationally funded science museums that participated in the study), and those visiting with their families (between 31-40% of science centre visitors for institutions involved in the study). These findings suggest that PES participants (often termed ‘visitors’ because of the nature of the PES activities they participate in) are often young people, facilitated by their schools or by their parents, typically mothers, a pattern echoed in the BIS report and research on mothers’ family roles (Ipsos MORI, 2011; Reay, 1998). Research also suggests that science centre visitors are usually middle class people from White-European ethnic backgrounds (Ipsos MORI, 2011; Wellcome Trust, 2008).

Research on museum visitors highlights similar patterns; most visitors to museums in Britain are from the dominant White ethnic majority, from upper and middle classes<sup>4</sup>, educated to degree level, female, without a disability and based in urban areas (Department for Culture Media and Sport, 2011b; Ipsos MORI, 2001, 2006). What this means is that in the British context PES participants are drawn from White ethnic, middle and upper classes, who live in cities and visit with their families or schools. Examining research on who *does* participate in PES, research suggests that people who *do not* visit science centres or museums in Britain are from disadvantaged socio-economic groups, in other words working class backgrounds, and from minority ethnic groups (McPherson, 2006; Wellcome Trust, 2008).

More research specific to non-participation in PES has been carried out in North America and suggests similar conclusions. Gender, socio-economic position and ethnicity have all been identified as important markers of non-participation (see for example Ash & Lombana, 2011; DiMaggio & Ostrower, 1990; Fenichel & Schweingruber, 2010). For example, issues of gender bias in favour of male experiences have been highlighted in research on exhibit design (Dancu, 2010). Furthermore, research suggests that boys tend to receive more attention during

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<sup>4</sup> In their report on museum and gallery visitors, Ipsos Mori (2006) specify this as people from the AB social class, which relates to higher socio-economic positions according to this method of categorisation.

family visits to PES activities than their sisters and motivate family participation in PES (Borun, 1999; Crowley, 1999). Furthermore, research suggests people living in poverty, particularly in socio-economically deprived urban settings, have particular difficulties accessing PES such as science centre visits or after school science clubs, and struggle to see such activities as important or relevant (Calabrese Barton, 1998, 2007; National Research Council, 2009; Rahm & Ash, 2008).

The issue of disengagement has also been highlighted by research on the influence of ethnicity on non-participation in PES. Findings from research with Latino groups in the US suggest that PES institutions seem unwelcoming because they are expensive, provide little language assistance or translation, and that the science content presented is seen as irrelevant and uninteresting (Garibay, 2009). Language problems have also been shown to be an important reason for non-participation in PES for people from other minority ethnic backgrounds (Fenichel & Schweingruber, 2010). Moreover, language problems have been found to impede learning and active participation for people from minority ethnic groups if they do get involved in PES activities (Ash & Lombana, 2011).

Cultural differences between people from minority ethnic groups, the cultures of science, and the dominant White majority have been highlighted as salient factors in non-participation in PES (Aikenhead, 2002; Fenichel & Schweingruber, 2010; National Research Council, 2009; Roth, 2008). For example, science is associated with specific values, like objectivity (Longino, 1990) and particular linguistic practices (Lemke, 1990). In addition, research by Duensing has demonstrated how the organisation of institutional PES environments reflects the cultural norms of a given society (2006).

Thus, as Aikenhead (2002) has argued, for people from minority ethnic groups, participation in PES requires the negotiation of two sets of practices: those associated with science and those of the dominant culture, both of which may be off-putting. Aikenhead refers to such negotiations as 'border crossing' practices (2006). Roth (2008) takes this argument further and suggests that engagement



with science is inevitably a cross-cultural, hybrid event, through the combination of the unfamiliar cultures of science, students' 'homes', linguistic practices and new learning contexts. Therefore research from North America suggests that issues of language, relevance and culture as well as gender, socio-economic position and ethnicity may be important for understanding non-participation in PES in the UK.

That research on non-participation in PES found issues of cultural relevance to be an important part of non-participation, suggests the benefits offered by participation in PES advocated by existing research ought to be re-examined from the perspective of non-participants. Research on learning in science centres or museums has been carried out with visitors; in other words, with people who already participate. As a result, a great deal is known about those who do participate in museum visits, and how such people might learn. However, care is needed when this research is drawn upon to understand the PES experiences of other people, such as those who do *not* participate in PES because PES activities may not offer the same experiences for everyone. As Ash and Lombana have suggested, "relying so heavily on only a narrow slice of visitor representation for normative purposes is misleading at best, and inaccurate at worst" (2011, p. 3). To date, little attention has been paid to the experiences of non-participants in PES activities, especially in the UK, and for example, how learning may, or may not, take place.

Nonetheless, there is some evidence to suggest that PES experiences can be developed that provide enjoyable, social and empowering science learning experiences for people from disenfranchised social groups in some contexts (Aikenhead, 2002; Fenichel & Schweingruber, 2010). For example, research by Ash and Lombana (2011) has suggested that learning experiences in science museums can be successfully redesigned such that ethnically and linguistically diverse families can access information and enjoy their museum experiences. This is important given the background of PES and the tendencies within PES practice and research to focus on those who do participate because it suggests that

the benefits of participation in PES can be realised for those currently outside core PES audiences. Thus, equitable, inclusive PES experiences are not beyond the realms of possibility, rather the data suggest that at present such experiences are simply not typical.

#### **2.4.1 Insights from research on science education**

Another area of research that provides relevant insights into how and why some people do not participate in science engagement practices in the UK comes from science education. School science is responsible for one of the key relationships between people and science. However, as Reiss has noted, “many students drop science in school as soon as they have the chance” (2004, p. 3). The most recent *Public attitudes towards science* survey found a quarter of respondents agreed with the statement “school put me off science” (Ipsos MORI, 2011, p. 20). This suggests that attitudes towards science developed through school experiences are not necessarily positive for many students. Within this, one relevant issue identified by sociocultural studies of science education is the influence of gender, socio-economic position and ethnicity on the achievements of science students.

Research has shown that the achievements of British science students are patterned in the following ways. Female students achieve lower assessment results than male students in school science (Bradshaw, Sturman, Vappula, Ager, & Wheeler, 2007), as do students from disadvantaged socio-economic backgrounds (Hampden-Thompson & Bennett, 2011). Student numbers and achievement also varies according to ethnicity. In particular, Black Caribbean, Pakistani and Bangladeshi students underachieve in school science, and are under-represented in science at university, compared to students from other ethnic backgrounds, notably students from Indian, Chinese and White European backgrounds (Elias, Jones, & McWhinne, 2006; Springate, Harland, Lord, & Wilkin, 2008). Recent research has also suggested there is a mismatch between high science aspirations amongst ‘Asian’ students, and a low uptake of science careers, even when socio-economic position is controlled for (DeWitt *et al.*, 2010).

Concerns have been raised about the dangers of overstating the roles of ethnicity, socio-economic position and gender in science education and science career choices (Carter & Fenton, 2010; DeWitt *et al.*, 2010; Ulriksen, Madsen, & Holmegaard, 2010). These patterns nonetheless remain salient features of learning science in school, and, potentially beyond school. Such patterns suggest that science students are affected by social factors such as ethnicity, socio-economic position and gender in ways that influence whether they choose to continue with science education once it is no longer compulsory.

Research suggests two sets of factors account for the unequal patterns of attainment and pursuit of higher qualifications found in science education. One group of factors concern the nature of the science that is taught in schools, while the other group relate to broader discriminatory social practices. All of these factors can be considered social structures (Shanahan & Nieswandt, 2011). The kind of science taught in schools has been criticised as promoting a view of science as authoritative, expert-led, unquestionable and linguistically inaccessible (Brown, 2006; Lemke, 1990; Osborne & Dillon, 2008; Reiss, 2004). Teaching science at school as an unassailable force, it is argued, disengages students, resulting in the patterns of “drop-out/opt-out” (Madsen, Ulriksen, & Holmegaard, 2010, p. 1) described above. As a result, it has been argued that some students struggle to identify with school science (Shanahan & Nieswandt, 2011).

The second set of off-putting factors suggested by research on science education concern social prejudices embedded in science education that compound the disadvantages already experienced by people from non-dominant groups. Roth and Calabrese Barton have argued that in the North American context school science is prejudiced in ways that mirror the disenfranchisement of particular social groups:

The poor, people of color, and women may fail in school science (or be failed by school science) exactly because of the nature of science practices and forms of knowing that are stressed in teaching.

Unsurprisingly, minorities (e.g. African Americans, First Nations) and

women are often discouraged from studying science because its ways of knowing and its everyday practices privilege white middle-class and male standpoints. (2004, p. 5)

The argument made by Roth and Calabrese Barton suggests that those who are most likely to disidentify with school science are those from disadvantaged socio-economic backgrounds, minority ethnic backgrounds as well as women. Research on identity and science learning supports the claims made by Roth and Calabrese Barton (see for example Brickhouse, 1994; Brown, 2004; Carlone, 2003; Rahm & Ash, 2008; Rieggle-Crumb, Moore, & Ramos-Wada, 2011). Similar patterns of practice in science education and their impact on students have been noted by researchers in Britain (DeWitt *et al.*, 2010; Gill & Levidow, 1987; Solomon, 1997; Wong, 2011).

Thus, science education can be considered unappealing because it is difficult to relate to in two key ways. Not only can the content and form of science seem unappealingly authoritative, but teaching practices echo broader patterns of discrimination that disadvantage students from poor families, from minority ethnic backgrounds and those who are female. As a result, science education can be said to have exclusive tendencies. School is one of the main sites where people in Britain encounter and build relationships with science. Evidently there is a difference between attitudes to science, attitudes to school science and attitudes towards participation in PES. However, research in science education suggests that paying attention to the structure of PES practices and the roles played by social positions may be important for an exploration of non-participation in PES.

## **2.5 Summary and research questions**

This chapter has reviewed the context in which this thesis asks questions about non-participation in PES. The role of science in British society and the role of PES have been examined. This review has positioned PES as a form of cultural participation and, as a result, reviewed not only PES and non-participation, but the social inclusion policies that have influenced perceptions of inclusion and exclusion in PES practice. The way non-participation in PES has been framed by

policies and practices has been criticised here for not providing adequate explanations of non-participation. Instead, this review drew on theories about the relationships between cultural participation, social positions and the reproduction of social inequalities based on the work of Bourdieu and intersectional theorists.

This chapter has suggested that non-participation in PES is an important issue not only because it undermines the democratic ideals that informed the development of PES, but because it may represent a powerful form of disenfranchisement. Thus, while non-participation in PES can be seen as an important issue, this review has also shown that the perspectives of those who do not participate in PES remain underexplored. Drawing on research about patterns of participation in PES in the UK and more detailed research on non-participation carried out in North America, this chapter described what we already know about non-participation in PES: that it involves issues of social position, cultural background and perceived relevance. These conclusions were highlighted again by a review of sociocultural studies of science education which also suggested social position and relevance were key issues for educational engagement with science.

Some have argued that a research focus on demographic characteristics, like ethnicity, is not always useful (Carter & Fenton, 2010). For example, in relation specifically to PES, Falk (2009) has argued that demographic factors (described here as social positions) are too widely used as causal explanations of participation and cannot explain such patterns. Indeed, Falk has argued that cultural participation varies amongst both African Americans and White Americans and suggested that personality factors, such as whether a person enjoyed facilitating the learning of others, or exploring subjects for themselves, had more of an effect on participation than ethnicity (2009). Focusing on personality rather than social position is problematic, however, in at least two ways.

Firstly, noting variation within a particular social group does not necessarily imply that a particular social position has no influence on participation in PES (Dawson & Jensen, 2011). The research on non-participation described in this

chapter clearly suggests social positions such as ethnicity, socio-economic position and gender influence who does and who does not participate in PES. While patterns of participation may indeed vary within different social groups, the effects of overlaps between socio-economic position, ethnicity and gender, not to mention other social positions such as age, ability/disability and sexuality, remain underexplored and may shed light on these variations. For example, African Americans and White Americans can also be understood in relation to the many other social positions they inhabit, as well as their ethnicity, which may in turn affect their participation in activities such as PES.

Secondly, demographic characteristics or positions such as ethnicity, socio-economic position and gender, are, as Holland *et al.* have argued, “the more durable social positions” (2001, p. 271). Demographic characteristics are important because they illustrate social positions and “social position has to do with entitlement to social and material resources and so to the higher deference, respect, and legitimacy accorded to those genders, races, ethnic groups, castes, and sexualities privileged by society” (Holland *et al.*, 2001, p. 271). Thus, social positions are an important part of how access to resources, through participation in practices like PES, is negotiated. Focusing on personal, or what some have described as psychosocial or psychographic characteristics (Hood, 1993, 1995), risks obscuring the role played by social positions in patterns of participation (Dawson & Jensen, 2011). Furthermore, the work of Bourdieu suggests that personal or psychosocial characteristics may be considered part of habitus, and develop as a result of experience. Thus rather than focusing only on personality or social position, the theoretical framework described in section 2.3 suggests that these issues are related and can be explored together.

As the research reviewed here has shown, non-participation in PES is a multileveled and complex issue. It includes structural inequalities at the societal level, as well as questions about how marginalised social positions are experienced and understood at an individual level. This review also raises questions about how PES practices might contribute to the maintenance and reproduction of unequal access to PES. As Johnson has argued;

Bourdieu's model necessarily involves different levels of analysis which account for different aspects of cultural practice, ranging from the relationship between the cultural field and the broader field of power to the strategies, trajectories and works of individual agents. All levels of analysis, each composed of multiple components, must be taken into consideration to gain a full understanding of cultural works. (1993, p. 18)

From this perspective, an attempt to understand how non-participation in PES operates could take into account multiple levels of analysis, including the social context, the views and experiences of individuals and what happens in practice. The relationships between structural inequalities and non-participation in PES are likely to include issues of socio-economic position, ethnicity and gender, not to mention other social positions. The approach taken in this thesis is therefore, as discussed in section 2.3, an intersectional one. Given the complex factors involved in non-participation in PES, this thesis will focus on questions of how non-participation is experienced by people occupying disadvantaged social positions that overlap and combine more than one issue.

This thesis therefore explores non-participation in PES from the position of people from disadvantaged socio-economic and minority ethnic backgrounds who do not participate in PES. Furthermore, PES opportunities must be available for people to be able to not participate in them. Therefore, this thesis explores non-participation in PES from the perspective of non-participants who are based in London, a city full of PES opportunities. The research questions guiding this thesis are as follows:

1. How do social contexts influence non-participation in PES for people from socio-economically disadvantaged, minority ethnic groups?
2. What views and experiences do people from socio-economically disadvantaged, minority ethnic groups have of science and PES?

3. How do people from socio-economically disadvantaged, minority ethnic groups experience PES in practice?

These research questions form the backbone around which this thesis is organised. Issues of socio-economic position, ethnicity and gender, as well as other factors like age and health that influence non-participation in PES are focused on in Chapter 4, while Chapters 5 and 6 explore respectively the second and third research questions. These three questions and their differing emphases correspond therefore to the different levels involved in an exploration of cultural practice premised on Bourdieu's theories of field, capital and habitus (Bourdieu & Johnson, 1993). Firstly, however, in the next chapter, Chapter 3, I focus on the methods used to investigate these research questions and present an overview of the research design used to explore the questions above, including the pertinent issues of participant recruitment and how to carry out equitable research that does not reproduce problematic framings of 'non-participants'.



## **Chapter 3: Methodological approaches and research methods**

### **3.1 Introduction and research questions**

This study aims to develop a better understanding of non-participation in PES from the perspectives of specific non-participants, through exploratory research with people from socio-economically disadvantaged, minority ethnic groups, living in London. The research questions this thesis addresses are:

1. How do social contexts influence non-participation in PES for people from socio-economically disadvantaged, minority ethnic groups?
2. What views and experiences do people from socio-economically disadvantaged, minority ethnic groups have of science and PES?
3. How do people from socio-economically disadvantaged, minority ethnic groups experience PES in practice?

This methodology chapter discusses the conceptual and practical issues associated with this research project. The ontological, epistemological and axiological approaches informing this research are presented, followed by an overview of the research design, data collection processes and analysis. Given the nature of this research, this chapter also includes a discussion of ethical issues in the context of research with people who, in the literature review in Chapter 2, I termed ‘non-participants in PES’.

### **3.2 Methodology: Ontology, epistemology and axiology**

While there is some consensus around the value of making ontological and epistemological positions clear (Bourdieu & Wacquant, 1992; Campbell, 1981; Guba & Lincoln, 2005), over time there has been some slippage about what the term ‘methodology’ means. Here I refer to methodology as the process of reflecting upon methods, which “includes the assumptions and values that serve as a rationale for research and the standards or criteria the researcher uses for interpreting data and reaching conclusions” (Bailey, 1994, p. 34). In this section I focus on the issues raised by this research.

A study of engagement with science, whether in schools, politics or culture, can encompass a range of different areas. This research draws upon research in, for example, science and technology studies, science education, museum studies and cultural studies (Aikenhead, 2002; McNeil, 2007). As discussed in the literature review, this thesis positions PES as cultural field, with potential benefits for participants. It was also argued in Chapter 2 that participation was not equitable or easy for everyone to access. The work of Bourdieu, as well as theorists involved in intersectional research was drawn on, to explore theoretically and in policy terms how disadvantage might be reproduced through non-participation in PES. It is important, therefore, in a research project like this to pay attention to questions of social justice, equity and the values underpinning the research questions, in other words, axiology. In order to develop an axiological position, however, the ontological and epistemological perspectives implicated in this research must also be outlined, as these formed working concepts that guided this study.

### **3.2.1 Ontology and epistemology**

Certain underlying philosophical tensions arise from the range of research fields drawn upon in this study which have ontological and epistemological implications. Within science education, critical realism has become an increasingly popular research paradigm (Nash, 2005; Osborne, 1996), while among branches of science and technology studies, and other cultural studies (for example, museum studies) different forms of social constructivism hold sway (David, 2005; Macdonald, 1998). The mismatch between paradigms means that while views about the nature of knowledge (epistemology) are similar, there is a difference in how the nature of reality is understood (ontology).

To put the epistemological issues simply, both critical realism and social constructivism are based on the idea of knowledge as a social construct. Furthermore, the research questions of this study are concerned with the perspectives and experiences of non-participants in PES. The kind of knowledge the research questions are based on comes from participants' interpretations of events and their ideas, explored through interactions between research

participants and the researcher. The data collected by the study is understood to be generated by the research and research participants, and shaped by their intentions. Thus the theoretical background of the study, the research design and the research participants' experiences contribute to the data collected. Epistemologically, therefore, this study is interested in socially constructed knowledge.

In terms of ontology – the nature of reality under research – critical realism is based on ontological realism, while epistemological social constructivism typically goes hand in hand with ontological constructivism, where reality is viewed as constructed, and different views are positioned as relative and non-hierarchical. Advocates of critical realism propose that while participants may differ in their *interpretations* of reality, reality none the less exists in a manner that is outside or beyond a human capacity to know about it. The key components of critical realism, argues Bhaskar, are 'ontological realism, epistemological relativism and judgemental rationality' (1998, p. xi). The combination of socially constructed, relativist epistemology with ontological realism, tempered by a view of reality as comprised of several irreducible strata, provides the evaluative means of making rational choices between competing knowledges based on their apparent relationship with an external reality (Aronson, Harre, & Cornell Way, 1994; Bhaskar, 1975). However, while the application of critical realism to scientific practices and theories, which *can* be compared to the natural world, meets with a degree of success, the critical realism approach is less convincing when applied to social issues and the personal experiences of people from minority ethnic groups and their views of PES. What would constitute the 'external reality' against which such a set of social practices, beliefs or knowledges could be evaluated? Although critical realists have attempted to address these issues (M. Archer, 1995; Bhaskar, 1989), solutions have failed to provide a convincing account of how critical realism might be applied to social research.

This study is concerned with people and how particular people regard and experience PES. Similar studies of people's views about science have been

carried out in science and technology studies, and many researchers from that field have employed a social constructivist approach to both epistemology and ontology (for key examples please see, H. M. Collins & Pinch, 1993; Gilbert & Mulkay, 1984; Knorr Cetina & Mulkay, 1983). In contrast to earlier positivist approaches to science with realist epistemologies, researchers from science and technology studies suggested science could not discover ‘truths’ about reality, that instead “scientific facts are fabrications” (Knorr Cetina & Mulkay, 1983, p. 6). The problem of social constructivism rests upon how the word ‘fabrication’ is interpreted. In English, ‘fabrication’ has negative connotations and can be used to imply a falsehood.

Strong versions of constructivist ontologies led to arguments between researchers about whether all scientific facts could be considered false (Gregory & Miller, 1998). The extreme relativist ontological positions often associated with strong constructivist approaches have been widely criticised. Accepting multiple, constructed realities that are equally real, implies the absence of any real or true position, which becomes self-contradictory; how then could the truth of the existence of multiple realities be upheld as either true or better than competing realist ontologies (Hollis, 1994; Niiniluoto, 2002). However, less derisory interpretations of ‘fabrication’ exist, for example, in French ‘fabrication’ means to make or create, which echoes a less common English usage of the word. A weak social constructivist approach to ontology, where scientific facts, as well as people’s experiences and views, are understood to be made or created might serve as a better platform from which to develop this research project.

A strong social constructivist approach, as outlined above, not only undermines the practices of science, and other research, but is not necessarily useful in terms of understanding people. A position of ontological constructivism still enables comparisons and evaluations to be made about data (Burr, 2003), but not in the same way as the judgemental rationality proposed by critical realism, where comparisons are made against the ‘real’ world. Longino (1990) makes the point that:

While eschewing the concept of a single truth or the hope of a singular epistemological blessing, we can nevertheless rank theories as to their acceptability... That theory which is the product of the most inclusive scientific community is the better, other things being equal, than that which is the product of the most exclusive. It is better not as measured against some independently accessible reality but better as measured against the cognitive needs of a genuinely democratic community. (p. 214)

Longino emphasises the role of the social in constructing knowledge, evaluating knowledge and sharing interpretations of reality, such that research might be meaningfully conducted if a social constructivist approach is taken to ontology as well as epistemology. The position I will take in this research marries an awareness of the role of social construction in research with a more pragmatic awareness that most people do not understand their words or lives as relative constructions, but instead as real or true (Gomm, 2004). I wish neither to undermine the perspectives of those participating in this research project, nor the value of knowledge inherent in conducting academic research. Therefore in this study I will employ a weak social constructivist approach to ontology and epistemology, acknowledging the socially constructed nature of people's lives, opinions and experiences as mediated by some degree of socially agreed reality, albeit one constantly in flux and subject to interpretation.

### **3.2.2 Axiology: Social justice and critical hope**

The values that inform this research are drawn broadly from theories of social justice, including feminist research, critical race theory, queer theory and intersectional social justice research. What that list means for this thesis, in short, is that this research has been organised for the explicit purposes of investigating a problem, such that it might be better understood and, potentially ameliorated. I started the research from a PES practitioner's perspective, I was aware that the area that I and my colleagues worked in was not particularly inclusive and set out to explore why. Over the course of the project, while mapping the ways in which non-participation in PES worked from the perspective of the research participants

I realised how problematic many PES practices were. However, I remain persuaded by arguments from hooks (1994) and Freire (1992), as presented in Chapter 2, that cultural, educational and political engagement in practices like PES remain powerful ways to empower individuals and communities, and combat marginalisation, and continue to hope this research will help create PES concepts and practices that are more inclusive and equitable. Indeed, as Freire argued, “critical hope” (1992, p. 8) alone cannot solve social problems, but it is a necessary precondition of attempts to understanding and resisting patterns of structural inequality.

Although the work of Bourdieu on the social reproduction of disadvantage, augmented by an intersectional understanding of social positions and marginalisation, has formed the theoretical backbone of this research, it is important to understand why structural disadvantages are problematic. While Chapter 2 reviewed these in more detail, in axiological terms, arguments about social justice in terms of inclusion and politics by Young (1990a), Benhabib (1996) and Fraser and Honneth (2003) have informed much of this research. These authors all highlight the value of inclusion into political, education and cultural systems. Furthermore, as Young has argued, exploring, acknowledging and understanding exclusion and marginalisation can be used to disrupt the reproduction of social disadvantage (2000). Theorists of social justice have influenced not only the substance of this thesis, but also the research design and conduct of the research, including a participatory approach to the research and relationships between the researcher and research participants, as will be discussed further in section 3.3.

### **3.3 Research approach: Qualitative, ethnographic and multiple methods**

A qualitative approach was taken to this research. Qualitative research methods, as Creswell has argued, enable complex questions about human experiences to be explored:

Qualitative research is an inquiry process of understanding based on distinct methodological traditions of inquiry that explore a social or

human problem. The research builds a complex, holistic picture, analyses words, reports detailed views of informants, and conducts the study in a natural setting. (1998, p. 15)

From this perspective a qualitative approach provides a useful platform for exploring questions about people's lives, experiences and attitudes in relation to their non-participation in PES. Furthermore, qualitative approaches are frequently used in combination with social constructivism, since both entail an appreciation of the unique nature of personal experiences and the social nature of knowledge.

People develop complex, changing, and contradictory views and behaviours, which are in flux over time and mediated by a range of experiences (Lemke 2000). Too many studies of PES, museums and science centres can be characterised by their narrow focus on one intervention (often a visit to an institution), one kind of participant (typically those who do participate), at one time. Although not longitudinal in nature, since that was beyond the scope of this study, the combined qualitative, ethnographic and multiple method approaches used in this research are an attempt to develop a broader perspective on PES, to understand how it is situated in people's lives. Qualitative approaches provide a perspective from which to recognise the various, differing and fluid character of people's views (Creswell 1998). Qualitative approaches also enable people's experiences and multiple co-constructed views to be explored, generating data situated in the lived realities and particular contexts experienced by participants (Bloor *et al.* 2001, Glesne 2006). Since the research questions of this study are exploratory and focus on an under researched area of PES, a qualitative approach can also offer a great degree of flexibility and an emphasis on reflexivity (Guba and Lincoln 2005).

A number of concepts and tools are subsumed under the banner of qualitative research. This project used a mixture of research methods, broadly informed by an ethnographic approach to the study. It is important to distinguish here between an ethnographic approach and ethnography. Carrying out an ethnography was beyond the scope of this project, which was designed to target specific

participants in order to explore specific themes, rather than a broader, life-wide investigation of participants' lives. Furthermore, specific tools, like focus groups and interviews were used to elicit responses from participants on particular topics, so in that sense, this research was not ethnographic in that not all the data was naturally occurring (Brewer, 2000). An ethnographic approach, on the other hand, enabled the research design to include elements of participant observation, and a longer-term approach to data collection that resulted in far more time spent with participants than would have been involved in simply carrying out focus groups, interviews and accompanied visits. This more in-depth approach became a crucial part of being able to access participants' lives, building equitable relationships with participants such that their aims were incorporated into aspects of the research, which, in turn, helped maintain their participation throughout the project.

The initial phase of the research, participant recruitment, involved many meetings and time spent carrying out participant observation, in order to get to know participants and their communities, and, importantly, for them to get to know me. A detailed account of participant recruitment is presented below in section 3.5. Finally, as will also be described in more detail below (in section 3.7), taking an ethnographic approach meant data analysis was carried out continuously alongside data collection, and was used to reflexively inform the data collection process (Hammersley & Atkinson, 1997).

The other important advantage offered by a qualitative and ethnographic approach to this research was that it facilitated a research design comprising of multiple research tools, sometimes referred to as mixed or multiple method research (Dillon & Wals, 2006). The mixing of approaches or tools can increase the rigour of research by exploring research questions from more than one perspective, thus reducing reliance on one concept or tool, and is often found in case study research (Stake, 1994; Tashakkori & Teddlie, 2003; Yin, 1994). Indeed, even Bourdieu argued that using multiple methods provides a valuable alternative to what he describes as the dangers of "methodological monotheism" (1992, p. 226).



Multiple method approaches offer a degree of flexibility and variety of value to the exploratory research questions of this study, allowing research to be designed to maximise the range of concepts and tools available, rather than restricting them (Brewer & Hunter, 1989). As Brewer and Hunter have suggested:

Methods differ both in the kinds of data that they afford and in their vulnerability to particular kinds of error. The multimethod approach is a strategy for overcoming each method's weaknesses and limitations by deliberately combining different types of methods within the same investigations. (1989, p. 11)

Using a multiple methods framework therefore offered the increased validity and reliability of using multiple methods in combination. Multiple method approaches enable under-researched areas to be explored in depth, involving multiple participants and their day-to-day lives as well as new experiences. A multiple methods approach also enabled this study to treat participants as individuals and as a group through the use of different research tools. As Kelly has argued, it is important to situate research "in a social context, in space and time, working within particular social and cultural constraints" (2008, p. 104). Through using a qualitative, ethnographically embedded approach to data collection alongside multiple methods this study attempted to explore the social, personal and practice based contexts of non-participation in PES.

### **3.3.1 Equity in research: A participatory approach**

A large number of social research projects depend upon the participation of others, often as volunteers. However, much social research, thus dependent on participants, is carried out in a manner that locates the management of the research process, from design to analysis and eventually publication, with the researcher, with little space for participants before or after they have taken part in data collection. This researcher-oriented approach is problematic for studies such as this, informed by the concepts of social justice. A researcher-oriented study can result in a power difference between one kind of research participant (the

researcher) and another (the researched) (Gomm, 2004; Reay, 1996). To counteract the tendency for power differences between the researched and the researcher in social research, Crozier has argued that: “in researching social justice issues and participation, engaging the actors in a dialogic relationship with the researcher is essential, together with the research participants having some ownership of the data” (2003, p. 80).

Research carried out with a participatory approach can shift the role of participants to that of co-researchers. This kind of participatory approach is common in action research and projects that are considered to directly empower participants (Gomm, 2004; Kemmis & McTaggart, 2005). In conducting research exploring the views and experiences of non-participants in PES, there are a number of advantages to developing the role of participants into one of co-researchers. Firstly, it sets up a more equal relationship between those involved in the research, which is preferable from an ethical perspective. Secondly, for research concerned with the exclusion of people from PES practices, working with co-researchers rather than participants may be more appropriate in terms of the concepts and values of social inclusion and social justice with which the study is concerned.

There were difficulties, however, in carrying out this study as participatory research. One overarching issue was the project had little short-term benefit to participants. Thus every effort was made to negotiate processes and outcomes with participants that were felt to be mutually beneficial. For example, one outcome identified by three of the four participating community groups was a lack of research on their communities in general<sup>5</sup>. As a result these groups received short reports with a summary of this research specific to data from each group. Additionally, some groups felt that other members, in addition to those participating directly in the project, would benefit from taking part in the accompanied visits to PES activities, and these members were then included in

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<sup>5</sup> In addition the Latin American community group's gatekeeper brokered my access to the group by asking me to evaluate some community based cultural activities as part of a plan to attract arts council funding. This evaluation was carried out alongside the research for the PhD.

visits as a result<sup>6</sup>. These practices formed a key part of the recruitment process. Participants were offered copies of focus groups, visits and interview transcripts, and these were asked for in three cases. In three other cases, participants were also involved in discussions of the analysis of the data relating to their groups<sup>7</sup>.

For the majority of participants, however, a participatory approach to the research was seen as an additional burden which they had little interest in, or time for. Thus, of the 60 participants, only three were involved in any discussion of the analysis and results. As noted in research on participatory democracy, focusing on participatory approaches risks idealising participants and their willingness to take on additional responsibilities (Hornig Priest, 2009). Moreover, asking volunteer participants to take on additional responsibilities because a researcher has decided to take a participatory approach to a project with little consultation can be considered even problematic, since more work is being asked for. Another problem with involving participants in the analysis and presentation of research findings concerns the autonomy of the researcher. Since research is inevitably politically situated, while it is possible to include participants' voices, it is not always appropriate to take views at face value or represent opinions without critical reflection (Hammersley & Atkinson, 1997; Nast, 1994). Thus, while willing participants were involved in discussions of preliminary findings, ultimately responsibility for the analysis and its presentation lies with me, the researcher. Thus, this research is better understood as taking a participatory approach which informed choices made and the conduct of the research, rather than as a participatory project. Finally, it is also worth raising the point that a participatory approach is not the only way to do equitable research; research ethics and reflexive practices are of equal importance.

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<sup>6</sup> This happened with the Sierra Leonean community group, the Asian community group and the Latin American community group. In these three cases additional community group members attended the accompanied visits to museums or science centres without taking part in the research. The visits involved in the project were an appealing part of the project for some community gatekeepers and group members, and in some cases formed the basis on which participation in the project was agreed.

<sup>7</sup> One member from the Sierra Leonean group and from the Latin American group were directly involved in discussions of the analysis for this project. The third discussion was with the gatekeeper for the Latin American and Somali community groups.

### 3.3.2 The role of the researcher

The emphasis on fair and equitable research in this project entailed careful consideration of my role and responsibilities as a researcher. As described above, while a participatory approach afforded some, albeit limited, opportunities for participants to be involved in the research process and analysis, and every attempt was made to produce outcomes of interest and relevance to participants as part of the project, a participatory approach cannot negate the responsibility of a researcher. Questions about relationships between researcher and research participants are inevitable. Unlike my participants, I am from the White ethnic majority in the UK, with a middle class background and am a PES practitioner. I risked being seen as an advocate of PES, exploring the exclusion of the research participants from a field to which I am an ‘insider’. As Harding (1991) points out, to be white, is not to be without race, similarly my socio-economic status, and other personal and demographic attributes ought to be considered. Nonetheless, as others have argued my position as researcher does not prevent me carrying out this study, it simply requires care and reflexivity when planning, conducting, analysing and representing the research (L. Archer, 2003; Hopkins, 2007b) .

In discussing the role of researchers, many arguments have been made about the relative merits of being an ‘insider’ or an ‘outsider’ in relation to communities of participants (Ball, 1990; Crozier, 2003; Hopkins, 2007a). In the case of this research, given the social positions I occupy it would have been impossible for me to have attempted an ‘insider’ position. However, the amount of time spent with participants and their community groups during the project in order to first gain access and, second, to carry out the data collection, enabled relationships to be built between myself and participants. Indeed, as Brewer (2000) has argued, the social skills and relationship building necessary for carrying out ethnographic work were a crucial part of data collection for this project. Brewer states:

The social skills the ethnographer employs for this in their own life should be put to the service of the research; taciturn, uncommunicative people make bad ethnographers. The ethnographer must also quickly learn the special meanings given to specific forms of behaviour in the

setting if they are different from his or her own. Ethnographers earn people's trust by showing a willingness to learn their language and their ways, to eat like they eat, speak like they speak and do as they do. (2000, p. 85)

As Brewer suggests, a key element of the research process was time spent with participants and community groups, taking part in community events, before data collection could be negotiated. Difficulties arising in relationships between myself and participants were twofold. On the one hand, some members of community groups eager to participate could not speak English and I could not speak their languages, despite my attempts to learn key greetings and phrases. As a result some group members were unable to participate in the project and these negotiations were tricky to manage. On the other hand, withdrawal from the research field was also difficult to manage, having established friendly relationships with many participants through the data collection process.

The best description of my position as a researcher is that of “betweenness” (Nast, 1994, p. 57). The concept of betweenness in research refers to the idea that differences and similarities are inevitable in relationships between researchers and research participants. As a result, the extent to which we can be ‘insiders’ or ‘outsiders’ is always conditional, relational and never absolute (Brewer, 2000; Hammersley & Atkinson, 1997; Hopkins, 2007b; Nast, 1994). From this perspective I attempted to keep my role within the project flexible in order to fulfil the different roles required, to be honest with participants about my aims and to ensure that the research took place in as equitable a manner as possible.

### **3.4 An overview of the research design and data collection**

The research questions at the start of this chapter are concerned with exploring non-participation in PES from the perspectives of non-participants in three ways: social context, individual views and experiences and practice. As outlined in Chapter 2, a multi-level approach was taken to exploring non-participation in PES, in order to explore the structural, personal and practice based issues

involved. Taking a multi-level approach also provided this research with a structure different from the intervention-measurement model of research on museum or science centre visits. Thus, while accompanied visits formed one strand of the research, these were not positioned as interventions with measurable outcomes, but rather as tangible experiences for participants to engage with.

This project, therefore, aimed to explore different perspectives and how people make sense of their experiences. The research methods used to explore the questions driving this thesis were informed by a qualitative and ethnographic approach, and employed a mixture of research tools, allowing research to be carried out with groups and individuals. This research aimed to explore a range of attitudes towards and experiences of PES from the perspectives of multiple participants. Rather than using research methods and sampling strategies designed to promote comparability between different groups of participants this study aimed instead to explore the breadth of opinions and experiences of a range of participants. The tools used to collect data were participant observations, focus groups, interviews and accompanied visits to different PES activities (described further in section 3.6). These research tools were combined in ways that maximised research opportunities by facilitating flexible participation and allowing a great deal of time to be spent with participants through taking part in community activities. Furthermore, given the values informing this thesis, a participatory approach was adopted where possible.

A purposive sample was designed to focus participant recruitment through community groups in the London borough of Southwark, described further in section 3.5. A snowball sampling process was negotiated with community network ‘gatekeepers’ as starting points, from which four groups ultimately took part in the whole project. A Sierra Leonean group, a Somali group, an Asian group and a Latin American group took part in the participant observations, focus groups, interviews and accompanied visits over a ten-month period in 2010. The data collected with these groups amounted to four focus groups, 32 interviews and four accompanied visits, alongside almost 65,000 words of field notes based

on 10 months' worth of participant observation from the community group events to which I was invited.

A pilot study was conducted to test key elements of the project including the participant recruitment strategy, participatory analysis, coding strategies and substantive issues about whether the research questions were relevant to people who did not participate in PES. Based on the pilot study, the process of participant recruitment was moved forward as I realised how difficult this process was. Furthermore, participatory analysis strategies were revised to take a more realistic approach to the interests and available time participants had. Some of the issues raised in the pilot focus group were new to the participants, in particular, the concept of PES in political contexts and various socio-scientific issues. As a result I developed vignettes describing socio-scientific issues such as genetically modified crops or cloning to help explain the background of such topics, and to explain the role of related political PES activities (see section 3.6.2 for more information). The pilot also tested the value of the focus group format and specific focus group prompts; however, due to the smaller scope of pilot studies, accompanied visits and interviews were not tested. These were reflexively developed as they were conducted during the main part of the project. Data were analysed throughout the data collection period and the analysis was fed back into the research process (described further in section 3.7).

### **3.5 Participant recruitment: What does it mean to look for 'non-participants'?**

While the research methods used in this study are commonly used in social research, and even within research on cultural participation, this project is different because of the people who participated in the research. As a result, the most complicated part of the data collection for this study was participant recruitment. As the introduction to this chapter suggested, a circular problem is embedded in this research; having critiqued the ways in which excluded or non-participating publics have been conceptualised in Chapter 2, identifying individuals and groups as non-participants for research purposes can be considered equally problematic. For example, the creation of a sampling strategy

designed to identify and locate non-participants in PES can be seen as an example of identifying an individual or group as problematic.

Following on from the discussion of social inclusion policies and practices in Chapter 2, which highlighted the ways in which communities or sections of the population were constructed as problematic, this research project could be seen from a similar perspective. The problem and politics of identification and representation in research is no small matter (Nast, 1994). However, as Young has argued in relation to political representation:

All systems and institutions of representation group individuals according to some kind of principles, and none are innocent or neutral. Any form or system of representation poses the problem of the one and the many, and in my view, this problem is best addressed by active relationships of authorization and accountability between constituents and representatives. (2000, p. 143)

Interpreting this argument in research terms, suggests that there is no perfect system for the identification or representation of research participants. As a result, there is an inherent problem in carrying out social research of this kind; issues of social justice are complex, mediated and at times constrained by the processes of research (Cribb & Gewirtz, 2005).

I acknowledge the limitations of identification and representation inherent in this thesis, but argue, nonetheless, that given the dearth of research on how non-participation in PES operates in the UK, in particular, from the perspective of those who do not themselves participate, exploring these issues is of crucial importance to understanding and improving these situations. I accept that relationships between individuals and communities are not fixed or simple, and that group membership, whether organised around ethnic, socio-economic or other identities, is not necessarily the identifying characteristic it is sometimes presumed to be (Hoggett, 1997; Spencer, 2006)).



As discussed in the preceding chapter, there is more than one way to be excluded from PES and related activities. As a result, this research, and therefore participant recruitment, did not attempt to be representative, as some quantitative and qualitative sampling can be (Gobo, 2004). Instead, this study sought the opinions and experiences of individuals and groups who did not participate in PES via a purposive, snowball sample. The review presented in Chapter 2, suggested that people whose social positions were located in the overlap between low socio-economic position and ethnic minority backgrounds might be likely to not participate in PES. This perspective formed the initial basis for the design of a purposive sample. Purposive sampling involves the selection of participants according to certain aspects of the research, including the theoretical background of the project and practical constraints such as time, location and the resources available (Silverman, 2005).

The sample design for this project first identified a location where participants with overlapping marginalised socio-economic and minority ethnic social positions might be found alongside PES opportunities. Research suggests that London is a multi-ethnic, “global city” (Sassen, 2001, p. 322; Vertovec, 2007). As Sassen has argued, “global cities are a key site for the incorporation of large numbers of immigrants in activities that service the strategic sectors. The mode of incorporation is one that renders these workers invisible” (2001, p. 322). Thus, not only is London a city with high numbers of minority ethnic groups from many different groups, such that the population can be considered “super-diverse” (Vertovec, 2007, p. 1025), but that marginalised socio-economic status frequently overlaps with minority ethnic status as a result of the way that employment is structured. London was therefore identified as a city ideally placed for recruiting participants for this study.

Within London it has been noted that minority ethnic groups with marginalised socio-economic positions cluster in specific areas. This has led to arguments that where someone lives within London reflects not only their socio-economic and minority ethnic status, but also practices of institutionalisation that separate rich from poor, majority from minority ethnic groups, legal from ‘illegal’ status and

professionals from “serving classes” (Sassen, 2001, p. 322; Skeggs, 2004). Thus within London it is possible to identify areas with concentrations of participants occupying combined positions of minority ethnicity and disadvantaged socio-economic status.

The borough of Southwark is one such area. It is centrally located, bordering the Thames at its northern edge. Southwark can be characterized by extreme socio-economic differences within its population, ranging from the very wealthy in Dulwich, to the south of the borough, to the extreme deprivation experienced by residents of areas such as Elephant and Castle, Walworth and the Old Kent Road in the north and Peckham in the south (Department for Communities and Local Government, 2011). As might be expected from the work of theorists such as Sassen, Skeggs and Vertovec (2001; 2004; 2007) the poorer wards of Southwark are also home to diverse clusters of minority ethnic groups who migrated to London. For example, as Roman-Velazquez (1999) and Pero (2010) have noted, the Elephant and Castle area in Southwark is a community hub for Latin Americans. The sample design for this research therefore focused on these wards of Southwark and used a snowball sampling technique to recruit participants for this study.

The recruitment of participants for this study was difficult. People who were not interested or involved in PES were, understandably, disinclined to volunteer for a research project about their non-participation in PES. Furthermore, people who did not participate in PES were difficult to access. The recruitment strategy for this study focused on accessing grass roots community groups, in other words, groups who had organized themselves, rather than groups who came together as the result of service provision via another organisation. This meant I was able to identify community groups, within the more economically disadvantaged wards of Southwark, who had formed around a shared minority ethnic identity.

The idea of community is a contested one, frequently used to imply a degree of similarity between people that is not necessarily present (Hoggett, 1997). Thus the extent to which individual research participants can represent a community is

questionable and I acknowledge that none of the views given during the data collection could be considered representative of all members of that community group. To access grassroots community groups specific people were identified who were willing to introduce me to the groups they were involved with. During the participant recruitment phase of the project I contacted 42 different groups. Ultimately, with the help of community gatekeepers 60 participants were recruited from four groups. By negotiating access to a whole community group I was able to get to know group members over the course of the data collection. As a result I was able to recruit participants for both the individual and group research methods.

The community groups involved in the project were identified on the basis of an overlap between minority ethnic status and disadvantaged socio-economic status and whether the group members did not participate in PES. Within community groups, a mixture of ages and genders was aimed for to broaden the exploration of the intersecting of social positions and their relationship to participation in PES. However, while the development of an ideal sample can help to define which participants will be targeted, being too prescriptive is difficult; as Kitzinger and Barbour argue, “the precise composition of [participant] groups will often be a product of circumstance rather than planning; this is not necessarily a disadvantage” (1999, p. 8). As a result while three groups were mixed in terms of ages and genders, one group, the Asian group, was made up of people aged 50 or more. Furthermore, although both male and female participants were involved in the project, females ( $n = 40$ ) outnumbered males ( $n = 20$ ), (see Appendix 2 for a complete list of all research participants). Table 3.1 shows the breakdown of participants by community group and gender.

**Table 3.1: Participant breakdown by community group**

<b>Group</b>	<b>Number of participants</b>	<b>Female</b>	<b>Male</b>
Sierra Leonean	21	13	9
Latin American	18	10	8
Asian	13	11	2
Somali	6	4	1
Additional gatekeepers	2	2	0
<b>Total</b>	<b>60</b>	<b>40</b>	<b>20</b>

Language issues arose throughout this study. As mentioned in sections 3.3.2, 3.6.6 and 3.7.2 language issues affected who was able to participate, the extent of their participation and created issues for transcription. Participants were recruited on the basis that they could communicate with me in English, since I did not have the resources to provide translation. However, while participants were able to communicate with me, that did not mean they were fluent English speakers. For many participants, English was a second, third, fourth or fifth language. Thus, language issues raised specific issues for participation in PES in practice, discussed further in the analytic chapters. Particular group members, sometimes, but not always, the gatekeeper, acted as key informants in this study. As key informants I returned to them repeatedly, for clarifications, questions and reflections; in some cases key informants were happy to be recorded during these occasions (resulting in the multiple transcribed interviews with Abdou from the Sierra Leonean group and Maria from the Latin American group), but in other cases they were not. As a result no repeat interviews were recorded from the Somali or Asian groups.

It should also be noted that the grass roots community groups who worked with me themselves performed certain functions. They reinforced members' identities, for example, as 'Somali' or 'Asian'. One result of this, as was particularly

apparent with the Somali group, was that particular aspects of group identities can come to the fore. In the case of the Somali group, the religious aspects of their group identity were fore-grounded. This was apparent not only in the content of some conversations, like the interview with Khalid where he focused on his Muslim identity, the modest dress code followed by participants, but also by my encounters with other local Somali people during the field work. One woman was particularly explicit in describing that particular Somali community group as especially focused on maintaining a Muslim-Somali identity, on the basis of which she had decided to join a different, less religious Somali community group.

Furthermore, within every group participants described themselves as coming from different, and often multiple countries. Therefore the extent to which participants identified with, for example, the label 'Sierra Leonean' was fluid and context based. For instance, Abdou from the Sierra Leonean group described himself as Guinean in some contexts and Sierra Leonean in others. In addition, some groups described themselves in broad terms, for example, the 'Asian' group described themselves as 'Asian' while their members had very varied backgrounds. In this sense, as noted by others (Elias *et al.*, 2006; Modood & Berthoud, 1997), the term 'Asian' was used as an umbrella term by participants. These issues highlight the extent to which the views of participants cannot be assumed to be representative of the larger ethnic or socio-economic groups to which they belonged.

### **3.6 Research tools and data collection**

While the overall framework for the research was ethnographic, specific tools were used in order to explore the particular themes of the research questions. In the sections below, a brief outline of the reasons why each tool was used is followed by a review of how that tool was used in this research project.

The data collection was conducted in four phases. The first phase included participant recruitment, initial information gathering interviews and participant observation, which was on-going throughout the whole project. The second phase

involved focus groups with each community group and interviews. The third phase involved accompanied visits to PES opportunities chosen by the community groups. The fourth phase involved post-visit interviews, additional interviews not associated with visits and participatory analysis meetings. Focus groups, interviews and accompanied visits were audio recorded and transcribed, with the exception of an interview with Khalid from the Somali group, who did not want to be recorded, but agreed that I could take notes during our interview instead. Informal conversations were recorded in field notes, but not audio recorded and transcribed. Field notes were made after every research event which ranged from attendance at community events to recorded interviews.

**Table 3.2: Numbers of participants involved in each data collection point**

<b>Group</b>	<b>Focus group participants</b>	<b>Visit based interviewees</b>	<b>Additional interviewees</b>	<b>Visit participants</b>
<b>Sierra Leonean</b>	8	2	4	14
<b>Latin American</b>	12	4	5	6
<b>Asian</b>	5	4	0	10
<b>Somali</b>	4	2	2	3
<b>Gate keepers</b>	0	0	2	0
<b>Total</b>	29	12	13	33

Table 3.2, above, shows the number of participants involved in the different data collection stages. This table is included because it differs from Table 3.3 (below) since some participants were interviewed more than once, because, as described in section 3.5, some participants were interviewed as key informants, while others participated in interviews after focus groups and after visits. In addition, two community gatekeepers who were uninvolved in the focus groups or accompanied visits were also interviewed during the project. This was because they had been involved in much of the other fieldwork and were interviewed to

provide extra information about groups where little or no further informational interviews could be carried out. Thus the total number of participants for the project was 60, a breakdown of which can be seen in Tables 3.1, 3.2 above and table 3.3 below. Further details about participants can be found in Appendix 2, including a complete list of who participated in each research method from each group.

**Table 3.3: Number of data collection instances**

<b>Group</b>	<b>Focus groups</b>	<b>Visit based interviews</b>	<b>Additional interviews</b>	<b>Visits</b>
<b>Sierra Leonean</b>	1	3	7	1
<b>Latin American</b>	1	4	8	1
<b>Asian</b>	1	4	0	1
<b>Somali</b>	1	2	2	1
<b>Gatekeepers</b>	0	0	2	0
<b>Total</b>	4	13	19	4

Table 3.3, above, shows the number of instances when data were collected involved in the research. A focus group and accompanied visit was carried out once with each group. While interviews were carried out with each group these varied more in number and timing. For example, with the Asian group, it was not possible to carry out interviews that were unrelated to the accompanied visit, because no group members apart from those who took part in the visit were willing to be interviewed, nor was it possible to carry out interviews before the visit took place. As a result interviews from the Asian group were all carried out after the visit. In the three other groups it was possible to interview participants either before the visits took place or to interview participants who were not involved in the visits. The research design and snowball sample are shown in more detail in a diagram in Appendix 2.

### **3.6.1 Participant observation**

Participant observation techniques are commonly used in ethnographic research and involve the researcher being part of their participants' activities to a greater or lesser extent (Tonkin, 1984). Participant observations can range from the researcher as an unobtrusive 'outsider' to the researcher as an accepted 'insider' (Creswell, 1998; Tonkin, 1984). Participant observation was used in two ways in this research project; as an on-going process throughout the data collection and as a form of accompanied visit, discussed in more detail in section 3.6.4.

Throughout the participant recruitment and data collection period of this study participant observation was carried out with all four groups, resulting in approximately 65,000 words of field notes. It formed the cornerstone of getting to know participants, enabling them to get to know me, obtaining access and learning about the community groups and their members in a naturalistic setting (L. Cohen, Manion, & Morrison, 2011).

As such, the participant observation element of this project was the basis from which the other data collection methods were carried out. Participant observation took place at events to which I was invited, typically at weekends or during evenings, once or twice a month, and field notes were written up on the day of participation, resulting in field notes spanning the year of data collection, 2010. As Hammersley and Atkinson (1997, p. 185) have argued, "field notes cannot possibly provide a comprehensive record of the research setting". What the field notes from this project do provide, however, is an account of community group activities, group members and their on-going discussions. As a result, the field notes informed the analytic themes developed from the other research methods and provided valuable context.

### **3.6.2 Focus groups**

A focus group usually involves a group of people discussing a particular topic, facilitated by a researcher or moderator (J. Kitzinger, 1994; J. Kitzinger & Barbour, 1999; Morgan, 1998). Four focus groups were used in this project to provide an opportunity to ask participants about themselves and their views about PES, science, science education and cultural participation. In order to explore



views about PES, something participants were by and large not involved with, I used vignettes of PES issues and activities to provide background explanations about PES, in particular, the political contexts of PES. Vignettes are used by ethnographers to explore imaginary scenarios with people (Brewer, 2000). I used examples of an environmental PES project (the 'Green Streets' project in Lewisham), the issues raised by hybrid embryos and cloning, genetically modified crops, 'mad cow' disease, nanotechnology and mobile phones. One focus group was carried out with each of the four participating community groups, in community venues of their choice.

Focus groups also created a space for participants to discuss additional issues related to PES in a comfortable group setting, in a way that minimised my influence as a researcher in determining the terms of the discussion. For example, participants prompted one another and asked each other questions that I had not thought of, or did not feel comfortable asking. As Kitzinger and Barbour have suggested:

Focus groups are ideal for exploring people's experiences, opinions, wishes and concerns. The method is particularly useful for allowing participants to generate their own questions, frames and concepts and to pursue their own priorities on their own terms, in their own vocabulary. (1999, p. 5)

The disadvantages of working with focus groups include discussions being taken over or derailed by particularly confident participants, and less confident participants being overwhelmed. This problem was addressed by combining focus groups with interviews to provide opportunities for all participants to voice their opinions and discuss their experiences (Creswell, 1998). The data from focus groups were used to contextualise and triangulate data from field notes, interviews and accompanied visits (Vaughan, Schumm, & Sinagub, 1996).

### 3.6.3 Interviews

Interviews are a widely used research tool across the social sciences as well as a number of other areas (Fontana & Frey, 2005). In this study interviews were used as a tool with which to explore particular issues in detail as well as individual perspectives on non-participation in PES. Interviews were carried out with participants throughout the project and fell into three categories: those carried out to explore themes that arose in a focus group, those carried out to explore themes that arose in the accompanied visits and additional information-gathering interviews carried out with key informants to contextualise or reflect upon the study (Hammersley & Atkinson, 1997). 32 interviews were carried out for this project; eight related to focus groups, 13 related to accompanied visits and 11 informational interviews. Interviews were carried out in community venues that participants chose and interviews were carried out in pairs on three occasions since this arrangement was requested by participants.

Interviews can be intimidating or enriching affairs depending on the context. Given the ideals informing this research, I followed the interview-as-conversation approach common in some areas of qualitative research (Gomm, 2004; Kvale, 1996). In this style of interview it is acknowledged that interviewers and interviewees construct their conversation together. As a result, skills such as empathy and friendliness, which can elicit richer, more detailed responses to the interviewer's prompts, are regarded as beneficial rather than liable to bias the data (Holstein & Gubrium, 1995). Rather than suggesting individuals possess concrete views and knowledges that might be extracted by the right interviewer, positioning interviews as mutually constructed conversations is in keeping with a social constructivist epistemology. Therefore, the problems of biased interviews, unreliable data, the role of leading questions and subjective interpretations are all worth taking into account, but are rendered somewhat less problematic by understanding interviews as constructions in their own right (Kvale, 1996). Interviews were based on a conversational approach and provided an opportunity to explore the meaning of a topic to a participant, their descriptions of events and the role of science and participation in PES in their life.

### 3.6.4 Accompanied visits

Accompanied visit research has been developed in the museums and galleries sector and involves a researcher accompanying one or more participants to an event where participants are prompted to talk about what they experience and the visits are recorded (Hooper-Greenhill, Moussouri, Hawthorne, & Riley, 2001). Accompanied visits were used in this study to explore the expectations, processes and experiences of what happens to participants in a practice context: in this case participation in PES events (Bloor, Frankland, Thomas, & Robson, 2001). The accompanied visits were used to explore tangible examples of PES practice, and as such, were not seen as interventions, but simply another way to explore the research questions.

Four accompanied visits were carried out in this study, one per group, to a PES activity that participants chose from a list of PES activities available in London during the research period, as well as their own suggestions (see Appendix 3 for the full list and a table summarising each visit). PES activities in political contexts were considered for visits, however, these were rejected by participants as of little interest or relevance to them. This limited the extent to which the study could explore participants' reactions to political PES activities, and as a result, the study focused on experiences of PES in educational, cultural and social contexts more than anticipated.

Two groups (the Sierra Leonean group and the Asian group) chose to visit the Horniman Museum, a local authority museum in South East London with a mixed collection including a Natural History Gallery and an aquarium. The Somali group decided to visit the Centre of the Cell, an interactive science centre based at Queen Mary, University of London, in the East End. The Latin American group chose to visit a special exhibition of butterflies at the Natural History Museum, a national museum in central London. Visits lasted between two and five hours. In each case I provided funding for transport and refreshments for participants and visits were audio recorded.

Accompanied visits are not dissimilar to participant observation methods; a researcher takes part in an activity with others and observes events. In an accompanied visit, participants are aware of the researcher's presence and voice their own views and opinions throughout the event, eliminating many of the interpretative requirements of less obtrusive participant observations. This advantage is afforded at the cost of the potentially significant impact of the presence of both researcher and recording equipment on the participant, which Milroy and Gordon refer to as the "observer's paradox" (2003, p. 49). While I accept that this problem cannot be solved, combining accompanied visits with other methods, enabling participants to carry out visits in pairs or small groups, and getting to know participants over the course of the research, contributed towards reducing the impact of the researcher on the issues participants choose to voice.

The focus of this research is on exploring how PES is seen and experienced by people from minority ethnic backgrounds who would not normally participate in PES activities. Accompanied visits provide a tangible PES experience for participants to engage with. These experiences provided opportunities to explore PES in practice and investigate the third research question of this study. Additionally, as discussed in Chapter 2, PES is a nebulous concept, a term rarely used outside the PES industry and one that has been subject to changing meanings. As a result, was sometimes difficult to explain PES fully in focus groups or interviews, as I found in the pilot focus group. Through the inclusion of the accompanied visits, participants had a concrete PES experience to explore and reflect upon in interviews.

### **3.6.5 Research ethics**

Although aspects of research ethics related to equity and the role of the researcher have already been discussed in section 3.3 of this chapter, some practical issues were also involved. All data collection took place in public settings for the safety of the researcher and participants. Focus groups and interviews took place in community venues (for example, community centres or quiet cafes) and accompanied visits to PES events took place in museums, parks and science

centres, during public visiting hours. Full details of each data collection event were given to the relevant community gatekeepers and a research colleague in advance of each event. I transcribed the audio data and ensured it was fully anonymised prior to analysis and participants chose their own pseudonyms. In addition, PES practitioners involved in the accompanied visits were also anonymised. However, the PES institutions involved in the accompanied visits gave their permission to be named so that a degree of specificity would remain in this study.

A code was used to identify the anonymised transcripts. Audio data, transcriptions, field notes and the code relating the participants' identities to their anonymised codes have been stored digitally in password-protected files. The only real name in the field notes and transcripts is my own. At the end of the study the audio data will be disposed of according to the ethical guidelines of the British Sociological Association (2002) and King's College London. All quotes, data and the analysis presented in any ensuing publications or presentations have been and will continue to be fully anonymised. This research was granted research ethics clearance by King's College London (reference number REP (EM)/08/09-52, see Appendix 1).

Two additional practical issues concerned with ethics arose in this study; that of translation and that of 'partial' participation. Firstly, across the four community groups, as mentioned briefly in section 3.3.2, there were individuals with whom I had difficulty communicating due to mutual language barriers, and as a result, they were unable to participate in the research. In order to ensure that those who did participate fully understood the research process and their rights as participants, ethical agreement forms were left with community gatekeepers and explained several times at different community events prior to any research being carried out (sample copies of the information sheets, consent forms and the letter of ethical approval from King's College London can be found in Appendix 1). This was a concern since some participants had better conversational fluency in English than reading or writing skills.

Secondly, in three of the four groups, group members who could not participate in the project took part in the accompanied visits. These individuals could not participate directly in the project, either because they were younger than 16, or because they were considered to be vulnerable adults. In these cases, since they and the group expressed desire to visit the museum or science centre involved in the accompanied visits, they were involved in the group dynamics of the visit and recorded. However, they did not take part in ethical agreement processes and their own actions and talk were not transcribed.

### **3.6.6 Validity and reliability**

While there are many arguments about whether validity and reliability mean different things in quantitative and qualitative projects, there is agreement that these are important issues in both paradigms (L. Cohen *et al.*, 2011; Guba & Lincoln, 2005). Validity concerns the extent to which a study explores what it claims to, and therefore, the extent to which it is credible (Perakyla, 2004). Reliability concerns whether the claims made through data interpretation are grounded in the data (Lewis & Ritchie, 2003). These issues are closely related, and as Cohen *et al.* have suggested, there is “some blurring of the edges between validity and reliability in the literature” (2011, p. 204).

In this study reliability and validity are addressed in several ways. The methods used are consistent with the ontological, epistemological and axiological perspectives taken in this study. For example, as outlined in section 3.2.1, knowledge is understood to be socially constructed for the purposes of this study, therefore research tools were used that collect and generate socially constructed data. One potential limitation of this study is the extent to which people who do not participate in PES might understand what PES is and how PES practices work enough to discuss it. This problem was addressed through the inclusion of accompanied visits to PES activities and through the provision of concrete examples of PES activities for participants to engage with in discussions. In these ways, therefore, the research process can be said to be valid because it examines the phenomena it claims to.

One limitation regarding the reliability of the data collected was the potential positive bias in participants responses to the accompanied visits involved in this study. Since I organised the visits, participants may have tried to be more positive in their feedback than they might have been otherwise. Furthermore, by the time the visits were conducted I had spent between two and six months with the participants involved and was clearly seen as an ‘insider’ to PES, as well as someone they had befriended, and may not have wanted to upset. This potential reliability problem was addressed through critical reflection on their feedback and the comparison of their visit feedback with the recordings, field notes and photographs from the visits, as well as by comparison with the other data collected for this study.

The reliability of this study was therefore developed through the processes of triangulation, deviant case analysis and constant comparative analysis. Methodological triangulation, in other words, the use of multiple research tools to explore the research questions, provided a number of perspectives on non-participation in PES, and as a result the different data sources could be compared during the analysis. This provides a degree of robustness to the conclusions drawn from the study. In addition, respondent validation, also called participatory analysis, (described in section 3.3.1) was used and involved three research participants discussing an initial analysis with me. While the extent to which privileging participants’ perspectives on data has been questioned (Creswell, 2003; Hammersley & Atkinson, 1997; C. Kitzinger, 2004), involving participants in analysis was not only a key part of the approach used in this study, but provided opportunities to explore ideas from the data directly with participants and provided a space for them to question, oppose or augment the analysis. Thus, involving participants in the analysis was a useful and informative process that added an extra layer of reflexivity, rather than a tokenistic add-on (Charmaz, 2005).

The analysis of this project was highly contextual and involved a large amount of experiential data. As a result reading a combination of transcripts and field notes can provide an account of events that took place, but do not amount to the same

experience as taking part in the visit. Therefore I chose not to work with another researcher to attempt to replicate the coding. Inter-rater reliability is seen as offering more analytical rigour in qualitative research (Lewis & Ritchie, 2003). In this case, however, I decided that without having taken part in the whole project, asking another researcher to attempt to replicate my coding and make reliability judgements would have been problematic given the contextual nature of the data.

As has been argued by Cohen *et al.* (2011) many interpretations of data may be possible and valid from different perspectives. Therefore in terms of reliability, in addition to participant involvement, the methods and analysis involved in this study were discussed in research seminars at King's College London, a PhD student summer school and research seminars at Stanford University as well as four international conferences in order to provide opportunities for academic critique and accountability. Constant comparative analysis and deviant case analysis (Silverman, 2001) enabled me to review my own analysis against the data set and test themes and codes across the data, these are described in more detail in section 3.7, below. These processes were used to create what some have called internal reliability (L. Cohen *et al.*, 2011), that is, analytic coherence within the data set. Furthermore, so that readers may understand the steps involved and the decisions made about data analysis, in the analysis section that follows, the three data chapters and the appendices I have made the steps involved as transparent as possible (Perakyla, 2004; Silverman, 2001).

### **3.7 Analysis**

Qualitative research tends to produce large quantities of data, and the processes by which these data are developed into research findings need to be clear and thorough in order to be credible (Miles and Huberman 1994). The methods outlined earlier in this chapter concern three tools for eliciting talk from participants focused on their perceptions of PES and exclusion from PES, and one observational tool. Of the available analytic strategies, I focused on the substantive issues in the data. Within content analysis, two broadly different practices can be identified: thematic analysis and discourse analysis.



Thematic analysis examines talk as though it is a representation of what participants and researchers have experienced – a reflection of their attitudes and values (Frankland & Bloor, 1999; Ritchie & Spencer, 1994). Discourse analysis explores talk as sets of discourses available to speakers (Edley, 2001), rather than a depiction of the thoughts and feelings of participants (Hutchby & Woolfitt, 1998; C. Kitzinger, 2004). This research takes a social constructivist approach to epistemology, and therefore, I accept that the recorded and transcribed conversations that emerged from the data collection process are the product of interactions between myself and participants, rather than a means of eliciting otherwise hidden parts of people's minds. I also acknowledge, however, that people tend to understand their talk as truthful and meaningful (Gomm, 2004). As a result, instead of analysing the collected data as a series of discourses, from which speakers select particular accounts, the data were analysed thematically, although I accept this requires what Kitzinger describes as an “interpretive leap” (2004, p. 138).

Thematic analyses explore the content of data by grouping data according to themes, or codes; themes can be theoretically established prior to data collection or can emerge from that data in a more grounded manner (Miles & Huberman, 1994). In keeping with the ethnographic approach used in this study, as soon as data were collected they were analysed and used to inform the process of data collection; as a result the process of analysis was on-going throughout the project (Hammersley & Atkinson, 1997). The thematic framework used in the analysis was partly based on issues that arose in the literature review and the theoretical tools of Bourdieu, but also explored themes that arose from the data as I became familiar with it. For example, the analysis presented in Chapter 6 was based on the Contextual Model of Learning developed by Falk and Dierking (2000), but adapted to account for different patterns in the data and compared to the analyses presented in Chapters 4 and 5 that used theories from Bourdieu, intersectional research and theories of identity.

Data were coded into themes and then re-coded several times following the constant comparative method and divergent case analysis to check the data set for

patterns, counter-patterns, consistency and divergence. Constant comparative coding meant each code, whether emergent or theoretically derived, was checked against each new data set and deleted, augmented or renamed and re-described accordingly. This ensures that identified themes reflect the nature of the data, rather than simply the theoretical framework or only a small portion of the data (Hammersley & Atkinson, 1997; Silverman, 2001).

Since this study was qualitatively framed and therefore one example of a theme was deemed as interesting as a cluster of examples, divergent case analysis was used to test patterns identified in the data and to explore instances of difference (Hammersley & Atkinson, 1997; Miles & Huberman, 1994). For example, as presented in Chapter 5, three participants stood out since, unlike other participants, they did identify in some ways with science. Data from these three participants were explored in more detail to understand the ways in which they occupied a different position towards science compared with other participants. This in turn highlighted some of the issues associated with their social positions that meant, despite their identification with science as a subject, they were unable to engage with science in the ways they wanted to, illustrating the importance of social position in how people relate to science and PES. Units of analysis for this study included both individuals and groups, since data was collected in both individual and group forms and throughout the analysis comparisons were made within and between these categories.

Qualitative research can be questioned on the grounds of its reliability and validity, so, following a clear analytic process is important to help researchers treat data in the same way, to be rigorous and to make the analysis transparent (Miles and Huberman 1994). This analysis used the qualitative analysis software Nvivo 8 to assist with storing, indexing, cross-comparisons and mapping the data. Using Nvivo 8 meant that data could be treated in the same ways, despite the large quantity of data collected, enabling all of the data to be analysed and facilitating analytic triangulation. Furthermore the “interpretive leaps” (C. Kitzinger, 2004, p. 138) made as part of the analysis in this study are described in the following section as well as in each data chapter with examples from the data

and further examples are provided in more detailed coding frameworks in Appendices 4, 5 and 6.

### **3.7.1 Levels of analysis: Social, personal and practice**

The analysis carried out in this study is presented in the following three chapters by exploring each research question in turn. Accordingly, the way the data were coded for each question differed. In this section these differences are outlined in more detail. The research questions were designed to relate to different aspects, or levels, of the problem of non-participation in PES, following the work of Bourdieu and others exploring the reproduction of advantage and disadvantage in practices of cultural participation (1993). As argued in Chapter 2, in order to explore non-participation in PES, different levels of analysis are required, which, in this case were identified as a focus on social contexts and social positions (the first research question), on personal views and experiences (the second research question) and on practice (the third research question). A breakdown of the thematic categories identified with each of these lenses can be found in Appendices 4 (social contexts and positions), 5 (personal views and experiences) and 6 (PES in practice).

Across all three analytic foci the theoretical tools of Bourdieu, described in Chapter 2 and augmented by intersectional research, were used. This was supplemented in the analysis of practice with a specific theoretical framework drawn from the work of Falk and Dierking (2000). This museum practice based theory focuses on museum learning. It was used to explore the extent to which learning processes identified through research with existing museum visitors could be applied to participants in this study, and to explore issues of inaccessibility. Chapter 4 presents data concerned with the social contexts informing non-participation in PES, Chapter 5 presents data concerned with the personal views and experiences participants had related to non-participation in PES and Chapter 6 presents data regarding participants' engagement with PES in practice.

### 3.7.2 Transcription and translation

One often-forgotten early stage of analysis is the recording and subsequent translation of talk and observations into text (Gubrium and Holstein 2001). The process of turning talk into text is an analytic choice; focus groups, visits and interviews could be video-recorded, facilitated by a second researcher and observed by the first, recorded after the event as field-notes or reflections and so on. However, while transcribing talk strips away some of the context of the conversation (for example, body language, whether the room or the day was warm or cold, the physical arrangement of the space), and produce only partial accounts of the research experience, it forms part of the necessary reduction of the collected data into research findings (Kvale, 1988, 1996). Transcribing the research data is a practical step that renders talk more manageable and malleable for analysis (Miles and Huberman 1994). Focus groups, interviews and accompanied visits were recorded digitally with an audio recorder and transcribed in detail in order to provide as accurate as possible an account of what happened (Perakyla, 2004).

The issue of translation from community languages created some problems in transcription. At times, participants would speak in their own language during recordings. Without the resources to employ translators for each of the four community groups and my own inability to speak participants own languages, I was limited in my ability to understand everything that was recorded during data collection, and acknowledge this as a limitation of the research. Unclear and foreign language words are marked with [square brackets]. As Maguire (2007) has noted, it is difficult to carry out research in multilingual settings with limited linguistic skills. Linguistic difficulties were overcome to some extent by asking participants to translate between each other and myself and by the purposive sampling of participants with English language fluency. Nonetheless, language difficulties were a limiting factor in understanding and transcribing everything that happened in the research settings.

### 3.8 Summary

This chapter discussed the working concepts and research tools that informed the development of this study. This study employed a weak social constructivist ontology and epistemology and an axiological approach based on social justice. In other words, this study aimed to explore non-participation in PES with the hope that such an investigation might help bring about a more equitable situation. A participatory approach informed the research design, including seeking ways to meet participants needs within the project and the inclusion of participants in the process of analysis. A qualitative, ethnographic approach was used to inform the research design for this study, which used multiple methods in order to explore the three research questions.

60 participants were recruited from four community groups via a snowball method from the London borough of Southwark. The methods used in this study were participant observations, focus groups, interviews and accompanied visits to PES activities. This multiple method approach meant that methodological triangulation could be used to increase the validity and reliability of the research. Data were analysed in an on-going manner throughout the project. Data were categorised thematically through theoretical concepts drawn from the literature review and themes that emerged from the data as the project progressed. Themes were explored using a constant comparative method and divergent case analysis to increase the internal reliability of the analysis. The three analytic foci for this project were social context (the first research question), personal views and experiences (the second research question) and practice (the third research question). In the following chapters the analysis and findings of this study are presented and discussed.

## **Chapter 4: The puzzle of participation: Structured limitations and personal choices**

### **4.1 Introduction**

This chapter explores the first research question of this thesis: how do social contexts influence non-participation in PES for people from socio-economically disadvantaged, minority ethnic groups? Understanding the contexts of participants' lives and the 'bigger picture' is crucial to understanding their non-participation in PES. Without a detailed, empirically grounded exploration of the social contexts of non-participants, and the ways in which their social positions influence participation, exploring non-participation in PES is limited.

In this chapter I argue that the context in which non-participation in PES takes place involves a mixture of structured limitations and personal priorities. This chapter explores the effect of migration to London on participants' social positions and argues that marginalised social positions restricted their ability to participate in PES; without 'free' time, money or information visiting a science museum was difficult, if not impossible, for participants. This somewhat straightforward conclusion is then complicated by an exploration of participants' extensive involvement with community-based cultural activities. Their engagement with community-based cultural activities calls into question a purely structural analysis of exclusion from PES and suggests that relevance and habitus have important roles to play in cultural participation. Habitus is then explored in more detail in relation to non-participation in PES and conclusions are drawn about the role of non-participation in PES in the reproduction of disadvantage.

Understanding the relationships between access to PES, social positions, structural limitations and habitus is crucial for understanding non-participation in PES. If participation in PES is limited because of underlying factors such as poverty, insecure legal status and lack of information, these issues must be included in how non-participation is understood and how inclusion practices are developed. At the same time the dispositions affected by these structural

limitations also need to be taken into account. This chapter suggests PES practices could become more inclusive by understanding the combined influence of structured limitations and habitus on non-participation and developing more appropriate practices as a result.

This chapter presents an analysis of the whole data set, which was analysed to explore the social contexts of participants in terms of the issues that affected their non-participation in PES. A coding framework for this chapter can be found in Appendix 4, containing a summary of the themes identified, with descriptions and data extracts for each theme. The factors involved in the social contexts of participants are explored here with illustrative examples taken from the data, including, where relevant, divergent examples.

## **4.2 Migration as a social context**

The overarching social context of participants' lives was migration. All participants had migrated to the UK. Participants' migration trajectories are important because migration affected their other social positions, for example, their ability to access resources in the UK, and as a result, their socio-economic positions. Thus, as Holland *et al.* have argued, "social positions cut and cut again across one another" (2001, p. 286). While participants' identities cannot be reduced to their social positions as migrants, or even a sense of 'country of origin', given their multiple moves and 'homes', migration had profoundly affected their lives. Therefore, drawing on research in migration studies that has explored the effects of migration on cultural practices (Bhabha, 1994; Erel, 2010; Schiller, Çaglar, & Guldbrandsen, 2006; Spivak, 1999), on class (Gardner, 1995; Rouse, 1992) and on identity (S. Hall, 1996; Vertovec, 2004, 2007), this analysis positions migration as one of the key factors affecting participants' lives.

The participants in this project were accessed through grassroots community groups organised around shared ethnic identity (see Chapter 3). In other words, they had grouped themselves according to a sense of ethnic belonging. In two cases the groups were organised around the country people or their parents had migrated from (Sierra Leone and Somalia) and in the other two cases, the sense

of ethnic identity was geographically broader, encompassing a number of different ‘home’ countries (the Latin American and Asian groups). However, in these latter two cases, it should be noted that most of the Latin Americans were in fact originally from Colombia, and while the Asian group did include people from a range of ‘home’ countries and religions, a large number were from former British colonies in Africa (see Appendix 2 for a list of participants and their backgrounds). All participants had therefore experienced migration, often as part of a series of moves, and this in turn, affected how they saw themselves, or, to borrow from Holland *et al.* (2001) how they constructed their identities.

Participants moved to Britain to pursue opportunities to improve their lives, although the specific ways in which they understood such opportunities varied. For example, participants from the Latin American group were political and economic migrants who saw life in London as a chance to build a better future. As Luz put it, “I wanted change, but I wanted a good, permanent, better life than Colombia, and I said, why not come here?” Within the Latin American group, the pattern of migration was one where economic migration was increasing while political migration had decreased. Participants from the Sierra Leonean and Somali groups, in contrast, migrated to flee civil war and its effects.

Members of the Asian group came from a variety of different post-colonial countries, and as a result their migration was not motivated by one shared, specific national situation, but rather events in a number of different countries resulted in their move to the UK. Mr Bhakta, for example, was expelled from Uganda by the regime of Idi Amin during the 1970s, and described living as a refugee in a military base upon his arrival in Britain. Similarly Latika from the Asian group, originally from South Africa, described conditions there as “terrible” and argued that living in the UK was “much better than where I come from”. Although the exact reasons for migration varied between groups, all participants migrated to Britain in pursuit of a ‘better life’. However, questions remained about the extent to which participants were able to take advantage of the opportunities they expected.



What ‘opportunity’ meant differed between groups and participants. As Kemetta, gatekeeper to the Latin American and Somali groups, put it, “being here is an opportunity, and their view of an opportunity might be a bit different”. For participants, being in the UK represented primarily an opportunity to live safely and earn money. Some participants also highlighted opportunities for developing cultural capital through educational institutions. These opportunities were seen, however, as a second, third or fourth raft of possibilities, contingent upon securing safe living conditions and employment as an initial set of priorities. As new immigrants, therefore, participants’ priorities had been to secure housing and employment, and only after these basic needs were met, were participants able to prioritise access to cultural capital in any form.

This process can be described as a spectrum of experiences ranging from what Khalid from the Somali group called feeling like an “alien” in the UK, to what Maria from the Latin American group considered “getting mainstreamed”. Thus, in terms of the trajectories of participants as new migrants in London, time was a significant factor in terms of becoming sufficiently established such that participation in PES practices might be considered. Taking part in PES felt, for participants, within the remit of this second tranche of priorities, understandably far less important than the meeting of basic needs.

While the opportunities for participants to meet their basic needs in Britain were not always present, the extent to which living in the UK provided participants with access to cultural capital was also explicitly questioned by some participants. For example, Thomas, from the Sierra Leonean group, critiqued the perspective described by his friend Ibrahim, about how Sierra Leoneans ought to be more involved in the cultural and educational opportunities available in the UK simply as a result of living in Britain:

Thomas: The problem with Ibrahim, yeah, he thinks everyone that’s in England and isn’t doing as good as his idea of how people should be doing has no excuse for not doing that good, you know what I’m trying to say, and I think that’s a very ignorant view, it’s not the worst place

to live and it's not the worst place to be, but there's reasons for everything, if you know what I mean.

Emily: So you think he overlooks stuff?

Thomas: A lot of stuff, he just thinks, he's just comparing life in Sierra Leone to life here and imagining "oh, if I was here, I would have done this, that and that", but then, it's all relative isn't it, like if you're from here, you've got different problems and different things you expect

From Thomas's perspective, living in England presented him with "different problems" and different expectations. Migration and its effects on social positions limited the extent to which participants could access opportunities to develop different kinds of capital, whether economic or cultural, as was the case with PES participation.

#### **4.2.1 Structural limits arising from migration**

The effects of migration have been seen as creating disenfranchised minorities (Spivak, 1999). Migration affected how participants understood themselves, since, as a result of migration, participants were members of 'minority' ethnic populations, and as 'minorities', subject to particular forms of disenfranchisement. These forms of disenfranchisement were multiple. Issues of recognition, citizenship and legal status were raised by participants in relation to limitations on their access to opportunities for work, education, and political and cultural participation in London. In addition, language issues arose again and again as a source of difficulty for participants.

For participants in every group, issues of visibility and invisibility were raised when questions of participation, whether economic, political or cultural, were raised. Issues of visibility were rooted in how established a given individual or group felt in the UK, their legal status, and their confidence in terms of participation. For participants, this combination of factors meant they saw themselves as marginalised minorities. As Fatimata from the Sierra Leonean

group put it; “they’re not going to listen to us, obviously, because we’re minority people”. For example, members of the Latin American and Sierra Leonean groups were critical of the available information about their communities, citing a basic lack of information about their communities as a core problem with their marginalization and political powerlessness in Southwark, London and the UK as a whole.

During the research period, issues of visibility were manifested most clearly in the struggle within the Latin American community to be recognized as Latin American rather than Ibero-American, on official documents. Participants from the Latin American group were involved in community meetings, demonstrations, petitions and information campaigns during the summer of 2010 about the recognition of Latin American communities within London. As such, participants felt they were still struggling for recognition in London at a basic level and resented being grouped together with London’s Spanish and Portuguese communities.

Recognition as a member of a minority ethnic group was, however, complicated. There was a delicate balance between visibility and invisibility for participants and their communities. Participants from the Asian group, the most individually established of all participants, were proud of their legal status as British citizens. They described Britain as somewhere that had “helped” them escape from persecution abroad. Mr Bhakta, for example, described Britain as a haven:

The British government supported us because after independence we had the chance to acquire British citizenship, and we were protected all this time by the British, so they played a very important part and they allowed us to come to London [during the Idi Amin regime in Uganda].

For members of the Asian group, British citizenship had been long since acquired as a feature of their post-colonial and refugee status. In contrast, for participants

from the Sierra Leonean, Latin American and Somali groups, legal status was a matter of concern and anxiety.

Participants from the Sierra Leonean, Latin American and Somali groups referred to friends and family who were asylum seekers, illegal immigrants or temporary residents (for example, those with a student visa). Legal status structured participants' relationships with British institutions and national embassies from their 'home' countries, resulting in avoidance and suspicion of such institutions. For participants, insecure legal status resulted in anxiety about official institutions and a sense of safety through invisibility. For example, while involved in data collection, several participants warned me about asking questions that could arouse suspicion and mistrust amongst other group members, questions, for instance, about how long people had been in the UK, or why they were here. Furthermore, participants from communities with large numbers of 'illegal' immigrants expressed anxiety at being involved with institutional PES activities, for fear of having their name recorded in an official capacity. This meant participation in politically oriented PES activities and visiting official institutions like museums was regarded with suspicion.

Participants' ability to access British systems and services was restricted by their unfamiliarity with such systems, a lack of information and language barriers. As migrants, participants were sometimes unaware of the different opportunities afforded by living in the UK and, as a result, some struggled to access the support they needed, which affected their confidence. Participants in every group described not understanding the British infrastructure; how educational systems worked, how legal systems or employment law worked. In terms of access to PES, a lack of information about PES, whether in museums and science centres, or the politically oriented activities, meant participants struggled to identify PES opportunities or to relate to them. As Lucille from the Sierra Leonean group put it, "I'm sure with our people, they don't understand what is the museum there for". While this was not the case for every participant, there were participants in every group who felt they knew nothing about PES or why it might interest them. Participants' views and experiences of PES are explored in more detail in Chapter

5, suffice it to note here that a lack of information restricted participants' access to PES.

All participants had to adapt to new social, political and cultural systems in the UK. Language skills, however, were the key to being able to understand and access these systems. Erel has described the linguistic skills of migrants as a "salient marker of distinction within the migrant group" (2010, p. 654). Although all participants were multilingual, not all were fluent in English. Being unable to speak English fluently undermined participants' abilities to access information required to meet their basic needs about housing, health care, employment, education or legal issues, in addition to cultural opportunities or participation in PES. In these ways linguistic ability affected participants' abilities to accrue capital, whether economic, social or cultural. This finding is in keeping with Bourdieu (1991) who suggested that linguistic competences (which he also called linguistic capital) affect the extent to which people can accrue other forms of capital, and noted the ways in which dominant language use can empower some and disempower others.

The factors discussed here – legal status, visibility, security, access to information and English language proficiency – constitute structured limitations experienced by participants in terms of access to various resources in the UK, including access to PES. These factors affected participants' social contexts by restricting the ways in which they could access basic support as well as other forms of social, economic or cultural capital, and by compounding their sense of marginalisation as a member of a minority group. Thus participants were structurally excluded from a number of resources and opportunities in the UK, including participation in PES.

#### **4.2.2 Socio-economic marginalisation**

As new immigrants, participants occupied marginalised socio-economic positions, difficult living circumstances in crowded inner-city locations and at best, exploitative working conditions, or at worst, restricted access to employment, education and resulting economic and cultural capital. For example,

socio-economic marginalisation resulted from a lack of English language proficiency, devalued 'foreign' qualifications and 'foreign' work experiences. This pattern of marginalisation has been well established in research about migrants in large Western cities (Sassen, 2001).

Participants in all four groups faced difficult, often exploitative working conditions in London as a result of their migration in ways that influenced both their ethnic and socio-economic positions. For example, participants who had hoped to work as administrators or teachers found their job opportunities limited by their lack of English language proficiency, devalued foreign qualifications and, in some cases, legal status and instead worked in exploitative, menial jobs with little pay or security. Maria, a participant from the Latin American group, explained this as follows:

Most people will earn something like six pounds per hour I suppose [...] just one [job] after the other, and because nobody is necessarily employed with one person, so there's no concept of having breaks or routines, [...] it's bitty, there people here will have a cleaner who turns up, and they won't know anything about him.

Within the Latin American group many participants were employed as cleaners, and cleaning was discussed as a 'typical' job for community members. Recent research about the Latin American community across London as a whole has echoed this finding of exploitative working conditions and a concentration of Latin Americans working in the cleaning industry (McIlwaine, Camilo Cock, & Linnekar, 2011). This example typifies the patterns of employment for participants across all four groups. The work available for participants was poorly paid and as a result people often had several part-time jobs at the same time.

As a result, a sense of insecurity prevailed through conversations with participants about work. Across all four groups, few people worked in office jobs with 'regular' hours and weekends off. Shift work was common, as cleaners or nurses, and in each group, with the exception of the Asian group who were

mostly retired, people had more than one job. Long hours, low wages and difficult work were, however, preferable to unemployment, an issue discussed as a problem by participants in every group. As Young has argued, exploitation and marginalisation in terms of access to employment constitute a form of oppression and social injustice (1990a). However, it is the impact of these forms of social injustice on the extent to which participants could engage with cultural activities that is of specific interest here.

As participants in every group explained, these kinds of working conditions meant that participants had little money, time or energy to invest in visiting museums, art galleries, science centres, theatres and parks. Thus participants' limited economic capital restricted the extent to which they could generate other forms of capital through taking part in educational, cultural or political activities. For example, participants could not participate in PES since they needed to work, often around the clock, to earn enough money to ensure their survival.

In every group the concept of 'free' time was problematic; all participants felt this was something they did not have. For example, Luis Diego, from the Latin American group, laughed at the idea of doing activities when not working, telling me; "it's difficult because I'm working all the time, [...] sometimes I see my wife only one or two hours [each day], and I have to take care of my baby when she goes to work". He explained that he and his wife both worked shifts. One would work a night shift while the other worked a day shift so that someone could be at home with their children. While this was one of the more extreme situations across the four groups, people in every group talked about not having 'free' or 'leisure' time, using this as one of the reasons why they did not visit museums or similar institutions. As Sarasa from the Asian group said about the Horniman Museum; "I can see so many people going there, but I haven't got time to go".

Not only did low pay mean people had to work more, resulting in limited 'free' time, but it also meant there was little money available for activities outside work, should any time be available. As Maria from the Latin American group put it, to visit a museum or participate in PES activities; "you need to have enough

cash in your pocket”. Therefore across all four groups participants did not have the time, energy or money to participate in PES. These results are consistent with other research on the factors affecting participation in leisure activities that has found that disadvantaged socio-economic social positions, or social class, and ethnicity affect participation in leisure activities (Bennett *et al.*, 2009; Bourdieu, 1984; Gayo-Cal, 2006; K. Roberts, 2004). This analysis shows that participation in PES was limited by structured factors relating to participants’ social contexts as migrants, through a lack of money, time, energy, recognition, secure legal status, information and English language skills.

### **4.2.3 Age, gender and participation in PES**

Migration and socio-economic position were not the only social positions involved in how participants related to PES, age and gender were issues that also arose in the data. Age was an issue raised by participants from the Asian group and by older members of the Sierra Leonean group raised similar concerns. In contrast, gender was an issue that emerged in a number of groups, but in more subtle ways; for instance, in assumptions made about family participation in cultural activities such as PES and maternal responsibilities.

While participants from the Asian group described experiencing poverty, homelessness and unemployment as part of their experience of migration to the UK, they focused, as might be expected for a group of older people, on their age and health issues as factors that structured their non-participation in PES. As Kirin said, “the health, it doesn’t allow much you know”. She concluded that for the group, taking part in PES activities was unlikely given their age; “I think we have passed the stage”. A focus on issues of age and ill health intersected with issues of language and education, for older participants from the Asian and Sierra Leonean group. These participants considered themselves too old to learn the English language skills or scientific information they felt were required by PES activities. This finding is backed up by research on participation in leisure activities, where, alongside social class, age has been found to have “powerful and pervasive leisure consequences” (K. Roberts, 2004). With increased age comes decreased cultural consumption, in terms of, for example, television



watching (Bennett, 2006), listening to music (Savage, 2006), visiting museums and theatres, attending concerts and eating out (Gayo-Cal, 2006).

Gender issues also played a role in participants' engagement with PES. Implicit assumptions were made about women's family roles, especially in relation to motherhood, children and 'free' time. For example, in describing an imaginary scenario, Thomas, from the Sierra Leonean group, positioned the busy working mother as the adult responsible for organizing museum visits.

Imagine I was at one of my friend's house, and his mum came from work, and it was like nine o'clock, this is just like everyday situations I'm trying to put to you here, and his little brother said, "Ah yeah, tomorrow, Saturday, can you take me to a museum", she'd probably wouldn't have the time to do it.

So from Thomas's perspective, the imagined working mother is too busy to take her children to a museum, whether she wants to or not. Thus, for Thomas, and his imagined 'mother', limited time, as a result of her work, had a knock-on effect on the possibilities for the development of cultural capital, for both the imagined 'mother' and her children. While this echoes the finding reported in the previous section, that a lack of 'free' time limited participation in PES, it is also worth noting the role gender plays here; responsibility for the generation of cultural capital within the family is assigned to the mother.

The point about maternal responsibilities for the development of cultural capital through participation and the limits felt by working mothers was echoed by Maria from the Latin American group, who made the same point about her own life. She argued that a lack of leisure time together as a family restricted what they could do in terms of museum visiting or other kinds of days out, saying that "you might have the mum doing it, but it's not the same doing it on your own, it's a bit stressful really". Maternal responsibilities for facilitating family participation in cultural activities were raised in every group. For example, Kadiatu, from the Sierra Leonean group, described helping with her son's school trips to museums

as the only time she had visited museums. In contrast, stories like these were not described by male participants in any of the groups.

The gendered roles participants described in relation to their cultural activities are consistent with findings elsewhere. For example in the UK, in terms of women's roles within the family and family generation of cultural capital in 'host' countries, Reay found that mothers from ethnic minorities were more involved with the schooling of their children than fathers, and strove to secure the educational success of their children (1998). In terms of PES, research on those who do participate has also found that females represented more than half (56%) of all visitors to science centres and many were mothers visiting with their families (Ecsite-UK, 2008; Ipsos MORI, 2011; Wellcome Trust, 2008). The findings presented here suggest participants followed a similar pattern in terms of making assumptions about women's responsibilities for familial cultural practices, but these assumptions were not translated into practice as a result of limited economic capital, in other words, limited money, time and energy.

#### **4.2.4 Participation in PES and cultural activities**

What these findings suggest is that participants experienced structured limits to participation in PES, in ways that related to their social positions. In other words, participation in PES was difficult or impossible for participants because migration resulted in them occupying marginalised socio-economic positions that restricted their access to PES, in ways that were further affected, for some, by age.

Assumptions about the roles of women as mothers in family groups, mirrored elsewhere in society, created a situation where participants felt women ought to participate more in PES than they were able to. Under all these circumstances participants were left with little choice about whether or not they might participate in PES, they were by and large unable to do so. As such, their non-participation in PES can be considered a form of structured exclusion. Thus participants' social contexts as migrants living in marginalised social positions formed the basis from which PES became inaccessible. These issues can be

understood as the underlying preconditions required for participation in PES. The conditions necessary for PES participation identified in this analysis so far are as follows: sufficient confidence through social and legal recognition as a potential participant in PES, English language proficiency, relevant information, money, time and energy, good health (especially as related to age and mobility). Put another way, participants needed their own basic needs such as housing, employment and security to be met, before they could access cultural opportunities available in the UK, like PES.

Participants varied within and between groups in terms of the degree to which all or some of these factors directly affected their individual access to PES. For all participants, however, participation in PES was affected by more than one of the factors listed above. Thus non-participation in PES resulted from the interplay of several structural issues. Acknowledging the combination of issues is important because it suggests non-participation in PES cannot be addressed by combating or alleviating one or two of these factors. This analysis highlights some of the dimensions of the reproduction of inequality from the theoretical position of Bourdieu (1984): participants were involved in a cycle of reproduction that ensured their non-participation in PES as a result of the structural inequalities they experienced because of their marginalised social positions. In turn, their inability to access PES and other resources maintained their marginalised social positions. Thus the social conditions required for participation in PES, such as sufficient information, money and time, were hard, if not impossible, for participants to generate given their marginalised social positions. As a result, participants can be considered excluded from PES as a result of structured inequalities over which they had little or no control.

While it is important to appreciate that participants lacked particular resources, without which they could not participate in PES, these problems can also be understood as problems with both British society and the field of PES. For example, rather than identifying English language proficiency as necessary precondition of participation in PES, this could be positioned as a lack of appropriate translation facilities on the part of PES institutions in terms of their

marketing, websites and exhibits. As Yosso (2005) and hooks (1994) have argued, constructing the participation of people from minority ethnic groups only in terms of the cultural capital they do not have, and practices that they do not participate in, is ultimately limited in several ways. It overlooks the kinds of cultural capital and practices that participants are involved with, devalues these practices, removes responsibility from other social, cultural and political institutions and may, ultimately, contribute to the further marginalisation of participants.

That non-participation in PES arises solely from the lack of necessary conditions for participation to take place is, however, not the whole story. Despite the absence of conditions required for participation in PES, the same participants were extensively involved in other forms of cultural activity, in particular those within their communities. Participants were involved in a large number of what, following the work of Trienekens (2002) on ethnicity and cultural capital, I have called community-based cultural activities. Indeed, one of the most striking findings that emerged from the ethnographic participant observations carried out for this research was the extent to which participants were involved in community-based cultural activities and the importance they placed upon these activities.

This pattern of extensive participation in community-based cultural activities suggests that a straightforward analysis of exclusion from PES on the grounds of social context and position is not sufficient. Why did participants too tired, busy or poor to be involved in PES activities take part in events within their communities so frequently? While these two fields of cultural activity are not identical, participation in community-based cultural activities emerged as an interesting counter-point to non-participation in PES. In what follows, community-based cultural activities are explored in order to understand how and why participation in such activities was considered so important to participants, in comparison to the field of PES.

### 4.3 Community-based cultural activities

Taking part in cultural activities within their communities was highly prized by participants from all four groups, often as their only form of ‘recreational’ activity. For example, participants from the Asian group greatly valued their time together at the community centre. On the days I spent with them at their centre they played traditional Indian music, ate Indian food and celebrated festivals together. While it should be noted that participants were sampled from community groups and would be expected to spend time with that group, this pattern was still striking given the lack of ‘free’ time described by all participants.

Every group organised community-based cultural activities that mirrored or adapted cultural practices from their ‘home’ countries. These activities drew on their cultural heritage, from traditional dances and opportunities to dress up in special clothes, to feasts and festivals. During the time I spent with them, activities ranged from weekend language schools for children, to informal parties, cultural and religious festivals and more formal discussions about problems affecting the community, such as family breakdown or political recognition. Participants took part in community-based cultural activities in religious centres, people’s homes, and community centres, as well as in more opportunistic settings, such as the space between railway arches at the back of a community run cafe. For research participants, these activities were undertaken weekly or fortnightly, typically involving two hours or more, with specific events that took up considerably more time, such as festivals that lasted a whole weekend and involved several months of preparation.

Community-based cultural activities took up a considerable amount of participants’ time, energy, money and other resources; resources highlighted as missing preconditions for their participation in PES. Why was participation in community-based cultural activities prioritised? Participants still occupied the same marginalised social positions and faced the same resource constraints as they did in relation to their non-participation in PES, despite this however, they participated extensively in community-based cultural activities.

### 4.3.1 Why participate: The maintenance of transnational identities

Community-based cultural activities were important to participants as a way of maintaining their links to a 'home' culture and developing transnational identities. Their participation was based on their social contexts as migrants and the way they saw themselves. While migration resulted in particular forms of marginalisation for participants, their migration trajectories also created new, hybrid cultures and languages. Such trajectories involved complicated transnational relationships, cultural practices and economic relationships. Holland *et al.* have emphasised the importance of social positions in terms of how people understand themselves in relation to others, calling this "positional identities" (2001, p. 125). As such, transnational (positional) identities were a key feature of participants' lives. Being involved with community-based cultural activities helped participants make sense of their transnational social positions and multiple cultural backgrounds.

As a result of migration, participants occupied multiple social positions, in different countries. For example, although resident in the UK, all participants maintained strong links with family members, friends and colleagues in their 'home' countries as well as several other countries. In this sense, participants' ethnicities were established in ways that could not be narrowly defined as relating to either a 'home' country or as a minority group in a 'host' country, rather they can be understood as a result of migration trajectories, as transnational (Bhabha, 1994; Vertovec, 2004). Each group included participants whose personal migration trajectories involved living in several countries. These multiple migrations created complex social positions and identities for participants. Amongst participants in the Asian group, for example, India was frequently seen as one 'home' country amongst others, albeit one that some participants had never lived in. Mr Bhakta, for example, described 'home' as Uganda, India and the UK.

Transnational perspectives affected participants' financial practices, resulting in hybrid forms of socio-economic social position. The practice of sending money 'home' was common across all four groups. Money was sent 'home' to support

other family members, to buy property or run a business in the ‘home’ country. As a result, participants negotiated multiple forms of economic capital between the UK and their ‘home’ countries. While participants experienced disadvantaged socio-economic social positions in the UK, in relational terms, the same resources when used in another country resulted in more advantaged socio-economic positions and more capital. As Maria from the Latin American group put it, despite living and working in London, people; “don’t tend to spend here, it’s always going home, and his nephew’s here, and his brother that’s here, everyone, to buy property over there [in Colombia]”. Similarly members of the Sierra Leonean group organised financial aid schemes for people living in Sierra Leone, maintaining transnational economic relationships.

Participants negotiated other aspects of their transnational identities in strategic ways, drawing on various aspects of their identities, whether to fit in at school or to create capital in the UK and/or abroad. Thus participants were able to use their ethnic social positions to negotiate multiple socio-economic positions and develop certain forms of capital. Negotiations of this sort were, however, not without difficulties as participants sought to manage multi-perspectives, and ensuing tensions, that emerged from their transnational social positions. For example, Mr Bhakta from the Asian group owned a property in India, despite being brought up in Uganda and spending most of his life in Britain:

I built a house back home as well, back in India. The building took two years and it’s this new place, the way we want it to be, a big bungalow... Still, you can’t stay there when part of your family is here. Most of the time I spend down here [in London], out of my seventy years, forty years have been here.

Mr Bhakta’s situation demonstrates a key transnational tension for participants; he yearned for a home in a country from which his own grandparents had emigrated. For participants in every group, including those migrating from severe poverty, civil war or political persecution, ‘home’, remained somewhere they loved, and for some, a place they hoped to return to, no matter how unlikely. The

‘dream of home’ has been found in other research to be a key feature of transnational identities and how they are maintained (R. Cohen, 2008; Guarnizo, 1997). Such dreams created tensions in the lives of participants.

Thus participants sought to manage the changes in their lives as a result of migration, to adapt to a new country and to maintain both links to other countries and a sense of their own cultural identity. For example, Hawa, from the Sierra Leonean group, described the UK in comparison to Sierra Leone in terms of opportunities for children to learn, saying that: “in our days, we were a bit lucky, there was no war, they used to take us for field trips, we see things, but people after us didn’t get facilities like children in this country get”. However, despite recognizing the benefits of living in the UK, during several of our meetings she talked at length about how beautiful Sierra Leone was and how much she wished she was still there.

The impact of transnational perspectives on participants’ outlooks was, therefore, not unproblematic. Rouse and Vertovec have referred to this as “bifocality” of perspective (1992, p. 41; 2004, p. 974), arguing that migrants develop bifocality as part of adjusting to the dual, if not multiple sets of references required to live in more than one country. Similarly Gardiner (1995) has argued that contrasting views of ‘home’ countries of origin and new ‘home’ countries requires careful balancing work in order to maintain migrants world views and a dual, or in the case of participants in this project, sometimes multiple, sense of belonging. Thus transnational identities, and the tensions that came with them, were core issues in participants’ lives. It was these issues that made participation in community-based cultural activities so important to participants.

Community-based cultural activities created opportunities for participants to manage their transnational identities and make sense of their lives as migrants, and as such, were seen as extremely important and relevant to their lives. For example, Khalid from the Somali group was insistent that taking part in community-based cultural activities was crucial for Somali people in Britain to understand their own heritage. The importance of maintaining their cultural



backgrounds was emphasised by participants in every group, especially in terms of the young people in their communities. As Beatriz from the Latin American group explained; “the most important thing for me is the young people, who have to learn the traditions of culture to define [themselves]”. Thus Beatriz organised community-based cultural activities for herself and for others, with the importance of cultural heritage and its contribution to identity development in mind.

Participants saw the importance of community-based cultural practices, therefore, as relevant to the way they understood themselves, as Latika from the Asian group put it; “after five years you think you want to know where you come from”. What this means, is that in comparison to their non-participation in PES, participation in community-based cultural practices was motivated by the value it held for supporting participants identities, and as a result, these activities seemed very relevant, if not crucial, to their lives.

### **4.3.2 Why participate: Community-based cultural capital**

In addition to creating opportunities for participants to maintain, balance and develop their transnational identities, community-based cultural activities provided a second kind of opportunity, greatly valued by participants, to develop certain forms of capital. As well as resulting in certain forms of disadvantage, it has been noted that migration also results in alternative forms of cultural capital in ways that emphasise innovation, change and creativity (Bhabha, 1994; Erel, 2010). Through participation in community-based cultural activities, participants were able to build social and cultural capital within their communities, through meeting new people and developing new skills. In some cases, participants were also able to accrue economic capital through such activities as well.

Examples of developing social capital could be identified within every group. Participants used their involvement in community-based cultural activities to network with other migrants from similar backgrounds, living in similar conditions. Through links like these, participants were able to access useful information such as which local schools were ‘good’ schools for their children,

how and where they could access training and employment opportunities, housing information and health advice. Idyl, from the Somali group, saw the social opportunities, and the information provision potential of such opportunities, as a crucial part of the community-based cultural activities she was involved with, especially, in her view, for those new to the UK. Participants in each group described meeting close friends and even partners through such activities.

The development of cultural capital through participation in community-based cultural activities overlaps with the issues of identity and relevance discussed above. Nonetheless it is worth reiterating that community-based cultural activities provided opportunities for young people to learn ‘home’ languages, and older people to practice their languages. For example, members of the Freetown elders group, part of the Sierra Leonean community group I was introduced to, delighted in speaking Temne, and teaching it to younger group members. Similarly, participating in festivals, feasts, dances and musical activities helped participants to learn and keep alive various aspects of their cultural heritage. Certain group members were particularly respected for their cultural capital, whether for their dancing skills and links to the Rio Carnival (in the case of one Latin American participant) or for their musical abilities with traditional Indian instruments (as was the case with a participant from the Asian group).

An example from the Latin American group of the generation of social, cultural and economic capital illustrates how community-based cultural activities could be used to generate multiple forms of capital. Alejandro and Beatriz both ran their own companies based on aspects of Colombian culture. Alejandro ran music workshops for young people while Beatriz ran a community weekend school where students could learn Spanish and Maths, as well as learn about their cultural heritage and about how to find work or training opportunities. In this way these two participants had capitalised on their cultural resources, hoping to develop economic capital in the form of businesses, and social capital as community representatives and organisers, while their students could develop cultural capital.

Research by Erel (2010) on the experiences of Turkish migrants in Germany and the UK noted a similar pattern: some migrants were able to translate community based cultural capital into mainstream cultural or economic capital. Beatriz and Alejandro worked together strategically to maximise their resources to further particular agendas, in particular, to achieve greater recognition for the Latin American community within London and the UK. In this sense, their work could also be considered as trying to establish Latin American cultural capital as part of 'legitimate' cultural capital in Britain. Within each group, to varying extents, some participants were involved in translating community-based cultural practices into forms of capital as Alejandro and Beatriz had.

Participation in community-based cultural practices therefore provided the means to develop forms of capital, whether social, cultural or economic. Participants' transnational identities were not only maintained and developed through such community-based cultural activities, but used in ways that produced additional advantages, either in terms of personal social, cultural and/or economic capital or by transforming community cultural practices into 'legitimate' cultural capital in the UK context. Patterns like these, where participation in community-based cultural practices were prioritised and prized by minority ethnic groups, have been found in other research. Erel (2010), Trienekens (2002) and Yosso (2005) have also argued that people in minority ethnic groups draw on cultural practices, either from their 'home' countries, or on existing cultural capital within their communities, in ways that help them generate capital in the context of migration. In addition, Bennett *et al.* have argued that "attachments to trans-national cultures are more likely to take the form of continuing involvements in diasporic cultures within which specific forms of cultural knowledge function as cultural assets" (2009, p. 236). Thus, participation in community-based cultural activities and practices constituted a resource for participants that carried out two important functions; it maintained their transnational identities and facilitated the development of particular forms of capital.

In comparing participation in community-based cultural practices with non-participation in PES, issues of relevance and value emerge. While participants were restricted in terms of time, money and energy, they prioritised their involvement in community-based cultural practices because they saw these practices as both important and relevant in ways that connected to the how they saw themselves and their positional identities. Thus, the prioritisation of community-based cultural practices also speaks to the importance of culturally relevant activities in participants' lives. It is also worth noting that the preconditions required for community-based cultural practices differed from those required for participation in PES. The different requirements for participation in these two fields are particularly evident in terms of the factors relating to migration identified earlier (see section 4.2.4) as structured limits to participation in PES from the perspectives of the research participants; community recognition, legal status, confidence, linguistic proficiency and information.

In the field of community-based cultural practices cultural heritage, language skills and community recognition were recognised as not only important, but valuable. For example, English language proficiency was not always required; indeed, a core facet of many community-based cultural practices involved the speaking of 'home' languages. Furthermore, information was readily available through these community-based social networks, and often available in an appropriate language. As a result these were arenas where participants felt confident and welcome. Finally, in terms of resources, community activities were often free (and widely known to be free, unlike, as discussed in the following chapter, museum visiting) alleviating the perceived financial burden of participation.

Therefore important differences can be found between the field of PES and that of community-based cultural practices, which affect the ways in which they were accessed and prioritised by participants. Exploring participation in community-based cultural practices demonstrates that limited resources are not the only factors that affect practices of participation, nor are they the most important.

While the limits of time, energy and/or money did restrict participants' involvement in certain practices, comparing their involvement in these two fields shows the importance of other factors, such as language and community recognition. In particular the extent to which a field is seen as relevant forms a key reason for participation. In this case, community-based cultural activities related to participants' transnational identities and their need to develop capital in the UK, while PES practices were not seen as relevant in these ways.

Relevance is important because it suggests that non-participation in PES results from a combination of structural limits that exclude people from PES and participants' own choices and priorities about what seemed relevant to their lives. Thus far, the question of relevance has only been explored in terms of the maintenance and development of transnational identities and opportunities for the generation of capital. The concept of habitus provides a useful way of examining how participants understood the relevance the field of PES in their lives because it goes beyond simply comparing PES with community-based cultural practices. The following section describes participants' dispositions, or habitus, in relation to PES and examines the issue of agency in non-participation in PES.

#### **4.4 Playing the game: Habitus and non-participation in PES**

The role of habitus is important in terms of engagement with the fields of community-based cultural activities and PES. Habitus concerns the extent to which participants valued a given field. As Bourdieu put it, if a field is thought of like a game: "players agree, by the mere fact of playing [...] that the game is worth playing" (1992, p. 98). While this research was carried out participants were involved in playing games in different fields to varying extents. This analysis has shown that for participants, exclusion from PES resulted from a range of factors. However, it is important to ask, given participants investment in community-based cultural activities and their non-participation in PES, to what extent were they willing to 'play' the PES 'game'?

The concept of habitus is useful here in determining the extent to which participants were disposed towards playing the game of PES or not. For

Bourdieu, habitus is the bridge between lifestyles and capitals; the “disposition that generates meaningful practices and meaning-giving interpretation” (1984, p. 166). Thus habitus is a useful way to understand how participants interpreted their relationships with PES and with community-based cultural activities. Habitus also overlaps with the positional identities described by Holland *et al.* as a result of the orienting effects of social positions: “positional identities inhabit the landscape of Bourdieu’s habitus” (2001, p. 138). In this way, the transnational identities of participants form an important part of their habitus, in ways that influence what does and does not seem relevant to them.

There was an underlying assumption described by people in every group that taking part in PES, visiting science museums or being involved in political consultations on socio-scientific issues would be unusual for them. Fatima, from the Somali group, referred to this as a “social outlook” and, focusing on museum visiting, placed PES and museum visits low on her list of priorities:

Fatima: I don’t know anyone that’s decided one day, ‘oh, let’s go to the British Museum’, you know, if you’ve got the day off work, you don’t imagine spending it at the British science museum or the history museum, you spend it on sitting around, chilling, doing something else other than being in a museum.

Emily: And that’s because?

Fatima: I don’t know, it’s just priorities, it’s the importance of the museums, we just don’t find that the museum is that important, or it’s part of our social outlook. If we have a day off, we have our priorities, so we will go out with our friends, we’ll go to a new club, we’ll go to a cafe, it’s not part of our social outlook, so that’s the problem.

To Fatima, museums, whether scientific or historic, were irrelevant, unimportant and of low priority. Fatima had developed a disposition that “evaluated the pertinent features” of museums as of little interest or relevance to her and her

community (Bourdieu, 1984, p. 166). So for Fatima, and other participants, visiting a museum was far more unusual than not visiting one.

The quote above from Fatima demonstrates how she positioned non-participation in PES within a social framework such that her perspective appeared grounded in patterns of behaviour common among her friends, family and acquaintances. Kadiatu, from the Sierra Leonean group, similarly explained non-engagement with PES as part of the status quo amongst her community saying; “that’s the bottom line, I would say half of the Sierra Leone community, they never just sit down and say ‘let’s go to the science museum’”. So for participants, their own non-participation in PES reflected what they saw as community-wide non-participation with PES. Their own behaviour was positioned as part of a group norm. Participants did not register PES as something that they, or people they knew, would be involved with. Their habitus was such that participating in PES was, as Abdou from the Sierra Leonean group put it, “not on the list”. This finding highlights again the perceived irrelevance of PES from the perspective of participants.

Not everyone saw participation in PES activities as unimaginable. Exceptions took the form of two participants from the Latin American group and one from the Somali group who described wanting to participate in PES and similar activities. These three participants saw being in London as “a great opportunity for culture”, as Ana Maria from the Latin American group put it. For the three of them, living in London represented a chance to discover new things, as Hamiido from the Somali group said, “I only go everywhere, I want to see”. Their curiosity was, however, not specific to PES opportunities, but rather applied to the range of new opportunities available in London, since libraries, cinemas, theatre and a number of visitor attractions, such as the London Eye, were also mentioned. The sense of curiosity described by these three participants demonstrates a difference in habitus from other participants because they did not rule out PES opportunities as irrelevant to their lives.

Despite their willingness to participate in PES activities, these three participants did not participate in PES. In this respect these three were part of the broader pattern of non-participation. However, the habitus, or sets of dispositions, they had developed involved a sense of interest in taking part in the cultural opportunities living in London presented to them. Thus, in comparison to other participants, these three participants simply did not describe PES as something they assumed they would not be involved in. Identifying the reasons why these participants differed in this respect from others has not been possible; they did not differ in ways that were obvious during the research process. These three divergent examples highlight the limits to which habitus can be generalised across all participants. Nonetheless, across all four groups, with the exception of three people, non-participation in PES was positioned as the result of choices framed by life-styles or ‘social outlooks’, in ways that can be understood alongside the role of transnational identities in framing PES participation as irrelevant.

#### **4.5 Non-participation in PES and the reproduction of disadvantage**

This chapter explored the influence of social contexts on non-participation in PES. Social contexts were found to affect non-participation in PES in two key ways. Firstly, the marginalised social positions occupied by participants meant PES was inaccessible to them as a result of structured limitations, such as available time and money, age, English language skills and relevant information (see section 4.2). These structural issues were considered the preconditions for participation in PES. Secondly, issues of identity and habitus were found to affect participation, as lenses through which participants identified activities as relevant (in the case of community-based cultural activities) or irrelevant (in the case of PES) to their lives.

Since both structural and personal issues were found to affect non-participation in PES, it is worth considering the relationship between these factors and the implications for non-participation in PES. For example, the extent to which exclusion can be considered exclusion if it results from the active choices made by an individual or group has been questioned (Burchardt *et al.*, 1999). It is



straightforward to consider exclusion from PES as a result of structured limits to the field. To what extent, however, can the rejection of PES participation as the result of perceived irrelevance and habitus be considered exclusion? Should non-participation in PES be understood as the rejection of an irrelevant ‘game’ or as participants being excluded from a field?

The empirical data presented in this chapter suggests that both of these perspectives should be considered as part of the same pattern. While the roles of both habitus and structured limitations are important, focusing only on habitus is problematic. For example, as Levitas has argued, the concept of habitus can be wrongly used to imply a causal relationship between attitudes and exclusion, suggesting that “the poor/excluded have the wrong values and attitudes that they pass on to their children, and fail therefore to acquire the appropriate skills and qualifications to succeed” (2004, p. 49). Thus, overemphasising habitus risks overlooking the role played by structural social inequalities, and as evidenced by this analysis, structured limitations do affect non-participation in PES. Given the empirical data presented here, an either/or argument regarding the importance of structured limitations and habitus is less useful than a theoretical framework that incorporates both issues, and considers non-participation/exclusion accordingly.

Bourdieu (1992) argued that fields and habitus are mutually affective. In other words, people’s experiences in a given field influence their habitus, which in turn, influences how they perceive a particular field and their subsequent behaviours. What this means is that while choice and habitus are clearly important factors in non-participation in PES, they are themselves influenced by structured limitations through people’s experiences. As a result, non-participation in PES can be considered a form of exclusion while including the concept of participants’ rejection of PES as irrelevant. As Young has argued:

Oppression in this sense is structural, rather than the result of a few people's choices or policies. Its causes are embedded in unquestioned norms, habits, and symbols, in the assumptions underlying institutional

rules and the collective consequences of following those rules. (1990a, p. 41)

It is these norms, habits and assumptions that create the conditions for non-participation in PES, both as structured limitations and individual habitus. As a result, the relationship between habitus and structured limitations can be understood as a mutually reinforcing cycle.

This cycle, the relationship between an exclusive field and the disposition towards non-participation, is at the crux of the reproduction of social inequality as theorised by Bourdieu (1984; 1990). As discussed in Chapter 2, research by Bourdieu and Passeron (1990) found that structured inequalities in the French education system led those most disenfranchised by the system, students from working class backgrounds, to become disposed against education. Such students then opted out of the education system, considering it irrelevant or unnecessary to their lives. Those who took themselves out of the field of education were then unable to accrue the available capital in the form of educational certificates or social networks. As a result, such students enacted working class life trajectories, and the cycle of social inequality continued.

The reproduction of social inequalities can be understood in this research as a result of the mutually reinforcing relationship between structured limitations and habitus. Participants saw PES as irrelevant to their lives and something that they, along with their friends and families, were unlikely to do. As Reay (1998) has argued, habitus results in a sense of what activities are possible, normal and likely to happen. For participants their involvement in PES activities was unlikely, abnormal and therefore seemed impossible. The disposition towards non-participation in PES was affected, therefore, by the inaccessibility of PES practices. It would be difficult for participants to cultivate dispositions towards engaging with PES without the money, time, energy, information, linguistic ability, confidence or physical stamina required to actually enact that participation.

Given the importance of science in British society, and the roles of PES discussed in Chapter 2, non-participation in PES can be understood to maintain and reproduce disadvantage. Not taking part in PES activities restricts participants' potential to build capital in at least three ways. Firstly, their political voice and engagement in socio-scientific issues is limited, secondly their opportunities for learning about science are reduced and thirdly they are unable to develop forms of social capital that come from participation in activities valued in British society. The analysis presented in this chapter suggests that non-participation in PES helps to maintain participants' marginalised social positions, and through this cycle, habitus and structured limitations can be seen to be mutually reinforcing.

Several implications arise from this analysis of the influence of the research participants' social contexts on non-participation in PES. The first is that since both habitus and structured limitations affect non-participation in PES, both must be taken into account if PES is to become more inclusive. This suggests that inclusive PES practice requires the structure of the field to change to become more accessible, and that dispositions towards non-participation will need to shift at the same time. Alongside these substantial implications for PES institutions, practitioners and policy makers, the underlying social conditions of disadvantage and marginalisation faced by participants must also be taken into account. For example, while PES institutions and practitioners may be able to change opening hours, reduce the costs of participation and target more information and marketing towards groups who do are not currently involved in PES, they can do little about the effects of underlying social contexts such as poverty. It is important, therefore, to recognise that non-participation in PES can result from these underlying structural features of life in contemporary Britain. From this perspective, changes to PES policy and practice can be realistically understood as potentially limited in scope.

The second implication suggests, however, that PES practices may hold some potential for social change. This analysis suggested that non-participation in PES contributed to the reproduction of social inequalities. By making PES more

inclusive, there is hope that participation in PES could in turn tackle broader, widespread patterns of marginalisation. This leads to a third implication that concerns the sustainability of the field of PES as a whole. In the long term, if PES is not relevant to the many different communities that make up contemporary Britain, then its rationale and role must be re-examined. Put another way, if PES is really irrelevant to communities like those of the participants involved in this study, then in an increasingly diverse country, PES may have to become more inclusive to survive. The fourth implication of this analysis for PES suggests that community-based cultural activities may have much to teach those involved in PES about developing practices that participants value and relate to. Indeed, incorporating a more detailed understanding of the transnational identities of participants may provide one way to address the perceived irrelevance of PES from their perspective.

#### **4.6 Summary**

This chapter presented empirical evidence to suggest that non-participation in PES resulted from the interplay of structured limitations to the field of PES and participants' habitus. This chapter first explored the social contexts of participants' lives and how the social positions they inhabited influenced their non-participation in PES. The straightforward structural analysis of non-participation in PES was complicated by an investigation of participants' extensive involvement in community-based cultural activities compared to their lack of involvement in PES. The important role community-based cultural activities were seen to play in participants' lives was understood in relation to their transnational identities and the opportunities such activities provided to create capital for participants. In comparison, participants saw PES as irrelevant to themselves and their communities. Non-participation in PES was understood by participants as normal, such that participation was considered highly unusual and unnecessary.

This chapter concluded that non-participation in PES formed a cycle that reproduced social disadvantages. Participants were unable to access PES, and in turn rejected PES as something of little relevance to their lives. As a result

participants were unable to accrue the different forms of capital participation in PES could provide, which maintained their marginalised social positions. The implications of this analysis suggest that despite the effects of underlying social inequalities, PES could become more inclusive through addressing structural limitations as well as habitus and by learning from what features make community-based cultural activities so important to participants.

The analysis presented in this chapter does, however, raise further questions for this research into non-participation in PES. To what extent is the non-participation in PES described in this chapter specific to cultural engagement with science and technology issues? For example, would a similar situation be found with respect to participation in the fields of the arts, heritage or sports? As discussed in Chapter 2 research has suggested that aspects of science may themselves be off-putting to people, or more damagingly, act as oppressive forces (Garibay, 2009; Harding, 2006, 2008; National Research Council, 2009). Furthermore, the factors involved in non-participation in PES identified in this chapter remain underexplored in terms of PES practice. These elements are explored in more detail in the following two chapters. Chapter 5 explores participants' views and experiences of science and PES, while Chapter 6 explores how PES is experienced in practice by participants.

## **Chapter 5: Dispositions and disidentification: Participants' views and experiences of science and PES**

### **5.1 Introduction**

This chapter addresses the research question: what views and experiences do people from socio-economically disadvantaged, minority ethnic groups have of science and PES? Thus, this chapter explores in more detail than Chapter 4 the views participants held regarding their own non-participation in PES, in particular those views and attitudes that were science or PES specific. Chapter 4 highlighted the important roles played by participants' social positions for non-participation in PES. This chapter investigates participants' experiences and views of science and PES in order to build a more detailed understanding of their habitus, a habitus that involved being disposed not to participate in science related activities or PES.

Exploring attitudes towards science and previous experiences of engagement with science is important because research suggests these are significant and enduring aspects of how people relate to science (Osborne *et al.*, 2003). Therefore, they may be salient features of how people relate to PES. These attitudes and experiences are not, however, the only ones that affect non-participation in PES. As highlighted by research on motivation in education, contextual factors are as important as content-based issues, such as attitudes towards science (Hidi & Harackiewicz, 2000; Hidi & Renninger, 2006). These studies suggest, therefore, that in the case of PES the context of engagement may also be important. The PES literature reviewed in Chapter 2 referred to the political as well as the educational, cultural and social contexts of PES (Bucchi & Neresini, 2007; Davies *et al.*, 2009). This chapter explores these contexts in turn. It starts with participants' experiences of science, most commonly identified as a school experience, turns to PES in political contexts and finally examines participants' experiences of and attitudes towards PES in educational, social and cultural contexts such as museums, science centres, the PES environments most recognised by participants.

Working with theoretical tools from Bourdieu, this chapter concludes with a discussion of habitus and how participants disidentified with science and PES. The analysis in this chapter draws on the whole data set, but rather than presenting examples from each community group systematically under each theme, themes are described with illustrative examples, chosen for comparison or because they demonstrate a particular aspect of a theme. Examples of divergent cases that did not fit with a particular pattern are also drawn on to explore different perspectives within the data. A coding framework for this chapter can be found in Appendix 5, containing a summary of the themes identified, with descriptions and data extracts for each theme.

## **5.2 Views and experiences of science**

Understanding how participants saw science is important because it affected how they saw themselves and how they related (or not) to PES. Most participants perceived science as something that did not appeal to them. Participants' views of science were framed by the contexts in which they encountered science: school, work, the media (in particular the internet, newspapers and television) and day-to-day life. In every group participants talked about seeing science on television, watching science documentaries and current affairs programmes. Museums, science centres and other PES institutions, in contrast, were not described as sites where participants encountered science.

With few exceptions, participants described themselves as not interested in science. They associated disinterest in science to aspects of science they felt were unappealing; science was uninteresting, too difficult to understand and simply not for them. These views of science were augmented by the idea that science was elitist, an attitude born out of participants' experiences of struggling to understand or relate to science, struggling to study science and, for some, struggling to find work in science related areas.

### **5.2.1 Science trajectories: School, employment and aspirations**

For participants in every group, science was framed by experiences at school, and in some cases, university and employment. Two kinds of science trajectory were

described by participants; growing disinterested in science with age, and remaining interested in science, but unable to study science or pursue scientific employment. All participants associated interest and engagement with science with youth and childhood. For most participants this early interest diminished with age, and their growing disinterest was associated with their school experiences. For example, Thomas, from the Sierra Leonean group, told me that he had disliked science at school because, “it became boring because it was in school when everything to do with school was kind of boring”. This extract suggests that Thomas saw his dislike of science education as part of his disassociation with school as a whole. Thus, from his perspective, the school based context of science was considered off-putting.

Participants’ school experiences of science strongly framed their views of science in all four groups. It was at school that science was found to be sometimes boring and particularly difficult to understand. For example, Sofia from the Latin American group described it as: “crazy physics things that I don’t understand”. Across every group participants described their own experiences of science as school based, as something associated with difficulty and something that they ultimately chose not to study.

While participants described negative experiences of science at school, the idea that children ought to learn science persisted. For example, despite his own dislike of school and school science, Thomas saw science as a core part of education, and as something that children, specifically, should learn:

Science, obviously, that’s a part of education, so there should be a certain amount of science that should be pushed towards people, just like reading and writing [...] but younger children that don’t pay any bills, you should get them to learn science more properly, if I had the power I would get them to learn science as much as English, as much as maths.



In the extract above, Thomas described a prescriptive element of a childhood/education framing of science: children should learn science. So for participants, being engaged with science at school was important, although their own experiences had negative and long lasting effects on their attitudes to science.

The second science trajectory described by participants involved a continued interest in science in the face of sometimes insurmountable difficulties pursuing scientific studies or employment. Mr Bhakta, from the Asian group, stood out as an example of someone who continued to be interested in science. He studied medicine at university in Mumbai and had aspired to a scientific career arguing that, “it’s a respected life when you are a doctor or a chemist”. Similarly, Ibrahim, from the Sierra Leonean group, had studied science at undergraduate and postgraduate level, had worked as a scientist in East Africa, and, like Mr Bhakta, professed a keen and on-going interest in science.

Despite their positive attitudes towards science in terms of education and employment, Mr Bhakta and Ibrahim had faced considerable difficulties trying to pursue their scientific ambitions. Mr Bhakta did not get high enough grades to continue with his medical studies, and had neither the finances for a “donation”, nor the personal contacts necessary to ensure he remained at university without high grades. He described the role played by “donations” and personal contacts as a common route for some of his wealthier fellow students to continue their studies without the appropriate test results. Ibrahim, on the other hand, had successfully pursued his studies of science, but could not find employment that used his scientific qualifications, either in Sierra Leone or the UK. In Sierra Leone he believed this was due to a lack of funds and jobs, while in the UK he felt his ‘foreign’ qualifications were not valued. Thus, although Mr Bhakta and Ibrahim differed from other participants through their active interest in science and pursuit of science through education and employment, they both fit a broader pattern where science was part of education and youth, but not an option as an adult. The interest and energy Mr Bhakta and Ibrahim put into their scientific endeavours was not enough to help them achieve their career ambitions.

Although only Ibrahim and Mr Bhakta described the second science trajectory in relation to their own histories, it was a common theme in how many participants saw science education and employment. Participants told stories of friends and relatives who had struggled to study science at university because of the high grades required, the money needed to study at university and the precarious, though high status, reward associated with finding a job at the end of such studies. Osmann, from the Sierra Leonean group, made this point by describing his brother's situation and the demoralising effect such stories had on other people:

My little brother, he's just 24, he graduated with a BSc in environmental studies, but he hasn't got a job to do, so he has to apply to a bank to work there, how can he? [...] So it's like, you see someone applying to university to do science, you say, 'my friend, I did this thing, I haven't got a job, why you do this thing? Go this way, there's no work there'.

Osmann could not accept the job opportunities his brother was faced with. He outlined why talking someone out of studying science might in fact be a more worthwhile and pragmatic way to help them than encouraging their studies. In every group pursuing science through secondary and higher education, or employment, was seen as difficult and sometimes inaccessible by participants.

While participants explained that they did not relate to science themselves, some thought it an important subject for their children to study in order to get certain jobs. As Maria from the Latin American group put it: "there is ambition in Latin American communities for their kids, they want the usual doctors and lawyers". Mr Bhakta, despite his own career disappointment, still saw science careers as high status occupations and maintained science career aspirations for his family. Mr Bhakta described a cycle of science career aspirations being passed down through generations through his father, himself, his children and grandchildren. This finding illustrates how perceptions of science qualifications and careers as

high status may remain in families and can be expressed through their aspirations for children, regardless of how exclusive and difficult entry into science may seem.

Thus, studying science was discussed in terms of access problems; limited access to knowledge (science was difficult to learn), limited access to the resources required to pursue a scientific education (studying science was expensive) and ultimately, limited access to employment (no jobs for science graduates). Therefore, while a small number of participants remained interested in science, ultimately scientific education, qualifications and employment were seen as difficult to pursue, and off-putting to most participants. Yet conversely, despite the apparent inaccessibility of scientific qualifications and jobs, some participants retained an interest in science and scientific aspirations for their children.

### **5.2.2 Disassociation from science: Science in ‘real life’**

Despite describing their broad disinterest in science, most participants saw science ever present in their lives, in ways that were both positive and negative. For example, after equating science with nature, Mrs Mallick, from the Asian group, outlined a broad and utilitarian view of science: “science is for medicine, all these things, for helping human beings”. The idea that science was everywhere was linked by some to the more utilitarian role of science in contemporary Britain. As Kirin from the Asian group put it: “I realise that science is important, without science we are nowhere, medical, transport, air, wind, everything”. Kirin saw science as something which included aspects of technology and nature and concluded that science was “everything”. She explicitly linked this omnipresent science with the benefits it brought, and for Kirin, as with other participants, little distinction was made between ‘science’ and ‘technology’. Kirin’s view of science as all-encompassing emerged across all four groups; science was everywhere.

Participants’ views on science depended on how they related particular scientific issues to their lives. During the Somali focus group, for instance, cloning was highlighted as something people found problematic in terms of their religious beliefs. Conversely within the Asian group, cloning was linked to the fertility

treatment someone's daughter was having and seen in a more positive light. These different perspectives suggest that attitudes towards science depended on the context of particular scientific issues in participants' lives. For example, after describing her dislike of science at school, Flor from the Latin American group, talked passionately about the science involved in learning to be a hairdresser. Thus, attitudes towards science were related to the perceived relevance of specific areas of science for participants, as research in science education has suggested (Calabrese Barton, 1998; Roth & Tobin, 2007). Participants were able to identify aspects of science in their lives which they could relate to, whether positively or negatively. It is important, therefore, to note that in comparison with the broadly dismissive views most participants held towards school science, participants did relate more to science experiences found within their daily lives.

Although participants saw science as present in their lives, whether positive or negative, it did not necessarily follow that they saw it as something they understood or were involved in. For example, Idyl from the Somali group, described what she saw as key differences between herself and her peers on the one hand and scientists on the other: "scientists are trying to discover the medicines, anything basically, that we, as normal people, don't see as science". Idyl suggested that "normal" people like her do not necessarily understand or even 'see as science' the work of scientists. Participants in every group distinguished between themselves and scientists, suggesting that they were not involved in science. As Mirza from the Asian group explained in an interview, science was for other people but not for her: "science is for people who want to be doctors, do biology, those sorts of things [...] but it's definitely not for me, I find it too much for my head". Thus while participants were more positive in some ways about aspects of science they could relate to in the contexts of their lives, as with their views and experiences of school science and employment, they still distinguished between themselves and those who were involved with science.

Another distinction made by some participants was one that combined gender with disassociation from science. Amongst the Asian group it was suggested that

science was male oriented, compared to a female focus on “domestic” work and “getting married”. This was, however, something participants associated with their age, noting that they knew of daughters and granddaughters who had scientific careers. Nonetheless, the distinction made by Sierra Leonean participants between doctors (a male elite with few members) and nurses (a vast female workforce) was remarked on throughout the project, as well as in interviews and the focus group, suggesting that for some, science remained was seen as a male dominated world. Thus, in terms of how participants related to science, the view ‘science is not for me’ emerged in more than one way.

The views and experiences of science described by participants suggest a pattern of disassociation from science, whether at school, as a job, or as something they could be otherwise involved with. With the exception of two participants, Mr Bhakta and Ibrahim, participants saw science as difficult, and as Mirza from the Asian group put it, “not for me”. While participants were more able to connect with science in contexts that related to their own lives, science was still marked as ‘other’ from their perspective, something for scientists, and from some perspectives, for men. For participants, therefore, disassociation from science can be considered part of their habitus, as an ingrained pattern of expectations and attitudes, informing their behaviours. One question raised by these findings is to what extent participants’ attitudes and experiences differed from those of other people? What, if anything, is distinct about the attitudes and experiences described by participants in this study?

The attitudes of participants towards science were more negative than those reported in the most recent Ipsos Mori (2011) survey. These attitudes may have resulted from the relationships between their social positions and the contexts in which they encountered science. As argued in Chapter 4, habitus develops through experiences. Therefore, what participants repeatedly described as difficult and unengaging experiences of science in school and a lack of employment for science graduates (including pro-science Ibrahim and Mr Bhakta) may have led them to feel that science was not for them.

Mixed perspectives regarding aspirations in science echo patterns in other research that has found science education was seen as difficult in itself, and not necessarily worth pursuing in order to gain employment (L. Archer *et al.*, 2010; DeWitt *et al.*, 2010). However, Modood (2004), Archer (2008) and Dewitt *et al.* (2010) have noted that British ethnic minorities, in particular second generation South Asian and Chinese families, are ambitious in terms of science education and scientific qualifications despite disadvantages associated with gender, socio-economic positions and ethnicity. This pattern fits with the science aspirations for younger generations described by Mr Bhakta and the findings presented here suggest that established Latin American communities may follow a similar pattern by wanting the “usual doctors and lawyers”.

The analysis, however, suggests that science aspirations were not universal. For example, aspirations were not always enough, and some participants, such as Osmann, felt scientific aspirations were pointless and distanced themselves from such attitudes. As Dewitt *et al.* (2010) have noted, aspirations do not always result in achievement for science students from some minority ethnic backgrounds. What is not clear, however, are the roles played by ethnicity and/or socio-economic status within patterns of achievement amongst minority ethnic science students (Elias *et al.*, 2006). The findings of this research suggest that Ibrahim and Mr Bhakta ultimately found science careers inaccessible as a result of their social positions. In the case of Ibrahim, his migration placed him in a context where his qualifications were devalued, restricting his access to employment in scientific fields. In contrast Mr Bhakta suggested that his own grades were not the barrier they might have been had he the money or connections held by some of his fellow students, suggesting that his socio-economic and classed position also limited his pursuit of a scientific career.

A gendered pattern of disassociation from science is well documented by research on exclusive practices in science education (Roth & Calabrese Barton, 2004), scientific communities and science decision making (Haraway, 1997; Harding, 1986; Rose, 1994). Disassociation from science has also been found in research at a national level, where adults in more developed countries saw

science as ‘for them’, while those in less developed countries saw science as ‘for others’ (Todorov, Petkova, & Bauer, 2009). Similarly, Archer *et al.* (2010) found students as young as 10 years of age saw science as something for other people rather than themselves in ways that were gendered and classed.

Thus, these findings map onto existing research in several ways, but suggest that participants had, if anything, more negative attitudes and experiences of science than have been found elsewhere. This finding suggests that participants’ habitus meant they were not disposed to relate to science, whether at school or in their lives. The findings reported here also echo those of Osborne *et al.* (2003) and the most recent *Public attitudes to science* (2011) survey that suggest school science plays a large part in attitudes towards science in later life. Experiences of science at school were described by participants as having a strong and long lasting effect on their attitudes towards science and therefore, their habitus.

With the exception of Ibrahim and Mr Bhakta, school science experiences led to participants becoming less interested in science and less inclined to pursue science engagement activities. However, as other have shown (Falk, Storksdieck, & Dierking, 2007; Lemke, 2000), school science represents a small portion of someone’s involvement with science over a lifetime. While the impact of school science on how people understand and relate to science is evidently important, it is not the only experience participants drew on to inform their views of PES, participants also drew on other experiences of science in society, as well as their attitudes towards politics and institutions like museums.

### **5.3 Views and experiences of PES: Socio-scientific and political contexts**

Participants, with one exception, had no experience of politically oriented PES activities, had not encountered such practices before and were not interested in taking part in one during the project. Because participants were unaware of the political contexts of PES, discussions of these issues were prompted during focus groups and interviews through vignettes, as described in Chapter 3. The examples provided for discussion included socio-scientific issues around genetically modified organisms (GMO), cloning and stem cell research, climate change and

environmental damage. In addition participants raised issues about organic food, pesticides and nuclear power. Discussions tended to focus on environmental issues since these were the most familiar to participants.

The political contexts of PES stand out in the data because these were not recognised by participants. While the literature reviewed in Chapter 2 highlighted the different branches of PES, such distinctions went unnoticed by participants. Only one person, Ibrahim from the Sierra Leonean group, had been involved in a more politically oriented PES activity. As a student, he had been part of an environmental research project in East Africa which had included an element of consultation with local communities about the research being carried out. His perspective, as one of the participating scientists, mirrored the widely documented views of scientists involved in public engagement: that the work was important, but difficult, and in some ways obstructed getting the scientific research done (Burchell *et al.*, 2009; Davies, 2008). The other participants had no experience of politically oriented PES practices or awareness of the existence of such activities.

Participants drew on their disassociation from science to explain why they would not consider participation in a political PES activity. In addition, participants felt they could make no difference to socio-scientific issues at a political or personal level because the issues involved, such as climate change, were simply too overwhelming. For example, Fatima and Idyl, from the Somali group, argued they could and did behave in ways that they felt were environmentally friendly, but they could not see how their contribution could make a difference. In the following extract they described what they saw as the demotivating, relative insignificance of their own actions:

Fatima: Personally I do recycle [...] but globally I couldn't care less (laughs) it's a really bad attitude to have, [...] if it doesn't bother you, like, immediately, if you don't see the effects on a day-to-day basis, then it's not really,



Idyl: You sit back (laughs) [...] personally I think, people out there, although they need help from each of us to contribute the way we can, I still believe that they can do the job on their own and wait for the result,

Fatima: They don't need help from us, we're only three people, out of a billion.

Fatima and Idyl struggled to see the role their actions could play, scientifically or politically, at the scale needed for environmental change. Although Fatima acknowledged that her attitude was a “bad” one, neither she nor Idyl felt their behaviours could make a difference and found this demotivating. They felt that the scale of environmental issues was so great that they could not relate to it. This perception was echoed in comments from other participants that socio-scientific problems were too overwhelming to face, echoing also perspectives from research on the risk society (Beck, 1992; Giddens, 1994).

Abdou, from the Sierra Leonean group, was more specific in his description of why people like him could not relate to environmental issues. He argued that people felt suspicious about their role in climate change:

We spend all the billions talking about the effects of climate change, you do all this educational sensitisation, but people at the grass roots or local level cannot connect to it, because they look at it as a foreign concept, that this is just something for the academics or professional people [...] but because people see it as them against us, or they're dictating to us, or it's a money making thing, [...] it makes it very difficult for them to accept it and connect with it.

In the extract above, Abdou illustrated why people may not see any point in their involvement in such issues. He argued that people could not relate to climate change politics, and that this was compounded by a ‘them’ and ‘us’ distinction that resulted in a general sense of mistrust and apathy.

So not only did participants have difficulty relating to the scale of socio-scientific issues and the politics involved, they were also put off by the way such issues were framed as something they were obliged to do by other people, who they could not relate to. This finding mirrors the pattern of generalised disassociation from science described earlier (see section 5.2). Participants differentiated between themselves and ‘others’ who had more interest in science, whom they did associate with science and with socio-scientific issues. This sense of difference was compounded by a sense of political disenfranchisement described by participants in every group in relation to PES in political contexts. Participants suggested they would not participate in such practices since they felt their views would be ignored, making their participation doubly pointless.

### **5.3.1 Disinterest and disenfranchisement in political PES activities**

In every group participants cited a basic lack of interest in science, socio-scientific issues and/or politics as the reason why they would not participate in PES in a political context. Some Somali participants argued they were simply not sufficiently interested in socio-scientific issues to consider them worth voicing an opinion on. For example, Fatima stated that she: “wouldn’t go as far as to participate in it [...] unless it’s something that I’m morally against, yeah, it would have to be something extreme”. Here Fatima drew on the idea of interest in specific issues as a rationale for participation in the political aspects of PES.

The issue of interest and how disinterest develops can be seen in how Alejandro from the Latin American group framed his own non-participation in political PES activities. At 31, Alejandro, was a veteran of political campaigning on behalf of his community. In this sense he differed from some other participants; Alejandro was very involved in politics. He was not, however, interested in political PES activities. He echoed the general disassociation from science described in every group, saying; “for me [science] is something that is a marginalised subject, it’s a subject very far away from my reality”. He prioritised community issues over socio-scientific ones, mirroring the patterns of participation described in Chapter 4. Furthermore, Alejandro voiced reservations about the potential uses of political

engagement with science, stating that: “politics determine what science does, and how it does it, and how we benefit”. In this sense, Alejandro was not only disinterested in science, and thus participation in politically oriented PES activities, he was also unsure whether such activities were themselves worthwhile.

Participation in political PES activities was questioned by others in terms of the potential for their involvement to effect change. For Fatimata from the Sierra Leonean group, the responsibility of government lay in consulting and empowering communities on socio-scientific issues, however, she did not believe this was likely to happen. She described her response to an imagined scenario, where she was invited to participate in a political PES activity:

If you asked me if I would like to be part of whatever discussion, based on science, to talk to government for them to listen, we’ll always say, ‘well, they’re not going to listen to us, obviously, because we’re minority people’, but that’s our perception sometimes.

Fatimata outlined her reservations about the value of her involvement in a politically motivated PES exercise: she did not believe that she, or other people from her community, would be listened to on the basis of minority ethnic status. She felt discriminated against: for Fatimata being listened to constituted a core reason to participate.

Fatimata also drew on the idea that the government ought to ensure that people are consulted on the basis that all members of the population are entitled to be involved in decision making processes, regardless of their ethnicity:

It’s up to the government to try their very best to make it very understandable that we are very important people of the community and that whatever we say is important, and it does affect us because we live in the country, so whatever decisions they make or might not

make, affect all of us, no matter your colour or wherever you come from.

What comes across in these extracts is Fatimata's desire to participate, as someone likely to be affected by socio-scientific issues and associated political decisions, but she clearly felt that her voice, and the voices of her community were not listened to, let alone sought out, on the basis of their marginalised ethnic status. This same point was made elsewhere. For example, Khalid from the Somali community group argued that Somali people had much to offer British science, culture and politics, and wanted to be involved, but felt left out from these institutions. The views of Fatimata and Khalid suggest that participants were disillusioned about the value of their participation in PES in a political context as a result of experiences of marginalisation based on their minority ethnic status.

Participants from the Asian group could not see a role for themselves in political PES processes, arguing they did not know enough about either science or politics to be able to usefully take part. They concluded instead that given the options they saw for themselves, they could, as Kirin put it "change ourselves", rather than expect to contribute to political change. Even change at a personal level, however, was mediated by concerns over a lack of knowledge. For example, in a discussion about food, participants acknowledged suspicions about the food they could afford, and argued that even if they wanted to, they could not buy the less processed or organic food they suspected was better for them. Thus, even at the personal, day-to-day level, they felt money and information limited the extent to which they could influence the socio-scientific issues that affected their lives.

The perceived inability to make even small scale personal decisions regarding socio-scientific issues was echoed in the views and experiences of Hawa and Lucille from the Sierra Leonean group. They wanted to be able to eat what they saw as environmentally friendly food, but were unable to do so because it was too expensive, as Lucille said: "we do eat them [genetically modified foods] because we have no choice, because we live here and we're poor". Thus, for participants,

the possibility of making small changes at a personal level was regarded as difficult and unlikely, let alone having influence at a community or national level.

As discussed in Chapter 4, participants were affected by structured inequalities that they could do little about, which constituted a key form of marginalisation in their lives. Participants felt unable to make a difference to socio-scientific issues either through their day-to-day lives or through participation in political consultations. Across all four groups, no-one suggested that politically oriented PES activities could be valuable or worthwhile. As Young (1990a) has argued, the inability to effect change either with regards an inability to express one's views in political settings, or change in one's personal life, as described by participants, comprise key components of disenfranchisement. In this sense, what participants described were the perceived limits of disadvantaged socio-economic positions and minority ethnic positions on their ability to affect change in relation to socio-scientific issues or politics and thus, to participate in PES in a political context.

Thus, for participants, non-participation in political PES activities drew on their disassociation from science, on their perception that socio-scientific issues were too big to influence and a general sense of political disenfranchisement, at a global, national and personal level. It is important, however, to examine how these views and experiences compare more widely. Interest and participation in politically oriented PES activities may not be standard or particularly common. Indeed Hornig Priest (2009) has suggested that academics, policy makers and PES practitioners overstate public desire for personal involvement in socio-scientific decision making exercises. As Marres (2005) noted, while some people are passionately driven to campaign about socio-scientific issues, this is not the case for many individuals. Research on attitudes towards socio-scientific issues and political PES participation in the UK has suggested few people are actually interested in being involved with political PES activities (Featherstone, 2008). Therefore the attitudes participants held towards political PES activities are not wholly unusual. Nonetheless, the broad lack of interest and underlying disengagement with both subject (science and socio-scientific issues) and process

(politically oriented PES activities) described by participants is striking. It suggests participants' habitus generated and reflected a disassociation from PES in political contexts.

#### **5.4 Views and experiences of PES: Educational, cultural and social contexts**

In addition to the political contexts of PES, the overlapping contexts which frame participation in PES as having educational, cultural and/or social outcomes deserve consideration. Some have argued that PES institutions such as museums, science centres and botanic gardens provide an appealing environment for engagement with science (Falk & Dierking, 2010; Rennie, 2007). As Chapter 4 suggested however, this may not be true for everyone.

Despite their non-participation in PES activities in educational, social or cultural contexts, participants discussed these forms of PES, and museums in particular, in a number of ways. Although visits to museums were not seen as part of their lives, some participants had visited museums or similar institutions before. In each group, however, there were also participants who had no experiences of this type. What is notable is that of all the contexts of PES, museums were the most recognised by participants. Participants talked about museums, aquaria, zoos, and to a lesser extent, botanic gardens and science centres. These institutions were, however, not seen as particularly distinct from one another.

The conflation of different types of educational, social and cultural PES experiences and institutions emerged for several reasons. Firstly, the broader context of educational, social and cultural PES activities in London was confusing for participants. Participants described a range of different institutions, including theme parks (Thorpe Park, Alton Towers) and visitor attractions (Madame Tussauds, the London Dungeons, Thames river boat cruises, the London Eye) as museums. This suggests that participants did not distinguish museums, science centres and other PES opportunities from activities within the broader field of public engagement and entertainment. From their perspective, PES institutions were part of a confusing field of 'visitor attractions'. Secondly, it should be noted that from a 'visitor' or 'participant' perspective PES experiences

at different types of institution may be perceived as very similar. For example, many PES institutions with educational, social and cultural remits include static and ‘hands-on’ galleries, living and dead animals and plants, as well as cafes, cinemas, shops and gardens. From the perspective of participants with little or no PES experience to draw upon, it could be hard to differentiate between these environments.

Thirdly, while participants were more aware of PES in educational, social and cultural contexts like museums, than political PES activities, they still knew little about them. Some participants, such as Maria from the Latin American group and Khalid from the Somali group, related a lack of knowledge about museums and science centres to growing up outside the UK. They suggested there were few opportunities to visit PES institutions such as museums or science centres in the countries they grew up in. For Maria, her experiences growing up let her to believe that museums and similar institutions in the UK were not for people like her: “[it] has nothing to do with us”.

Others drew on ‘home’ experiences and positioned museums as elitist institutions, located in cities far away from their homes. ‘Home’ experiences affected views of museums in at least two distinct ways; for some museums, science centres, zoos and aquaria in the UK were high status institutions that they could not imagine visiting. For others, being in the UK represented an opportunity to engage with museums and related institutions. For instance, Ana Maria from the Latin American group, described being grateful for the museums and libraries in the UK: “in Colombia we don’t have the chance to go to the museums, [being in the UK] is a great opportunity for culture”. Thus, although most participants knew little about PES opportunities in educational, social and cultural contexts, some saw potential advantages associated with such activities.

#### **5.4.1 The role of information, interest and relevance**

Even though museum ‘type’ institutions emerged as the most identifiable, albeit not well understood, form of PES, participants from every group felt little information was available to them about PES opportunities. For example, Abdou

from the Sierra Leonean group, felt there was little knowledge or experience of museums in general, and science museums in particular. This theme emerged from participants in every group; they felt that they, their friends and families were unaware of the activities and resources PES institutions might provide, what participation might involve, not to mention where PES opportunities could be found, or that some were free. In the context of how museums and science centres were seen by participants within a broader collection of visitor attractions, some of which are very expensive<sup>8</sup>, it is understandable that they might expect their participation to cost money. As Fatima from the Somali group argued, having never seen advertising or information about museums she could not be expected to know about them. She concluded that “unless you’re into museums, you’re not going to know”. Thus, as suggested in Chapter 4, one pre-condition of participation in PES in educational, cultural and social contexts was sufficient information about how to access such opportunities.

Reasons for participation in educational, cultural and social PES activities were discussed by participants in terms of interest. For participants, interest was the pivot around which motivation for PES participation was understood. The idea of interest as a motivating factor was identified in three ways, as interest in the place (for example, an interest in museums themselves), as an interest in the scientific content and/or as an interest in the cultural relevance of a particular event or opportunity.

Few participants discussed the idea of museums or similar institutions as intrinsically interesting. As Fatima from the Somali group suggested, while it was plausible that some people were interested in visiting museums or science centres, she believed such people to be in the minority. As she put it, “most British people don’t walk into museums. They’ve been in there, either by school or taking someone, but just for them to wake up someday and go, ‘I want to go to the British Museum’, I doubt it”. No participants described an intrinsic interest in

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<sup>8</sup> For example, entrance to the London Dungeon for a family of two adults and two children cost between £68.34 and £60.20 in 2011, as indicated by their website, accessed 23.3.11. However, for many of the people who worked with me, family sizes were larger than the ‘nuclear’ family unit of two parents and two children, so additional tickets would also be required raising the costs.



museums, zoos, botanic gardens or similar institutions, so this theme arose as a hypothetical projection: other people might be interested in PES opportunities in this way, but participants were not.

Instead participants described museums and similar institutions as unappealing environments. For example, Thomas from the Sierra Leonean group, drew on what he imagined a museum would be like, focusing on how such a place might make people feel uncomfortable:

People think that you have to go there a certain way, or do a certain thing when you get there. Maybe it doesn't fit in with your culture, like, could you go there with a supermalt and just chill? [...] Museums are for people that already know about science, that just want to see something. I would assume that it's not about people going there and learning something.

Thomas suggested that certain behaviours were required in museums and that a scientific background was a prerequisite for those who visit, rather than something that could be developed at a museum. He perceived a mismatch between his “culture” and the museum. Thus without ever having visited one, Thomas felt museums were unappealing and uncomfortable places.

Disidentification with educational, social and cultural PES environments was seen by some in terms of social position. Like participants from other groups, Abdou from the Sierra Leonean group saw the location of the museums in London, (far away from his home and difficult to get to) and the design of museums as symbols of their orientation towards “middle and upper class people”. Furthermore, Abdou felt ethnicity had a role to play in the unappealing nature of institutions such as museums; “looking at it from the race perspective, he's Black, he goes there, [...] say if you have a guide for example, we don't know what the set-up is, he will not be considered as a priority”. This quote and the previous quote from Thomas demonstrate the power of perception. Like other participants, Abdou and Thomas drew on a range of non-museum experiences

and imagined scenarios; neither had participated in any PES activities in educational, social and cultural contexts, but nonetheless perceived such environments as unwelcoming and uncomfortable. Across all four groups participants described similar feelings of disinterest and disidentification with museums and similar institutions. Thus, in contrast to claims made in the literature about the appeal of museums and science centres (Falk & Dierking, 2010; Rennie, 2007), for these participants the environment of educational, social and cultural PES opportunities was itself unappealing.

In talking about the possible reasons people might have for participation in PES in educational, social and cultural contexts, interest in science was cited as a possible reason for participation. Ibrahim from the Sierra Leonean group exemplified this perspective. He insisted that he was primarily motivated by his interests in science and argued that others ought to be as well. Ibrahim stood out because, unlike others, he saw himself as a scientist. To Ibrahim, other people simply lacked sufficient interest in science, and this explained their non-participation in science education, science engagement opportunities or science careers: “students are not going for study, they’re going for softer areas because people have this kind of mentality about science”. It seemed strange to him that people would not take advantage of PES opportunities in the UK.

Ibrahim was unusual amongst the participants because of his strong interest in science. Unlike other participants, he was interested in science, keen to take up PES opportunities and did not see science as something which was in itself off-putting. However, he echoed the descriptions of other participants about not knowing enough about engagement opportunities to find relevant ones. Thus, despite his keen interest in science he was part of the broader pattern of non-participation in PES. His experiences suggest that willingness to participate in PES is not enough if you do not know how or where to get involved.

Cultural relevance and interest was seen as another rationale for PES participation. Educational, social and cultural PES opportunities that related to participants’ cultural backgrounds and transnational identities were seen as

particularly interesting, and a strong motivation for participation. For example, participants from the Asian group described one museum as particularly appealing because it had sitars on display and another for showing Bollywood films, which prompted Meera to comment :“ah, all things Indian”. Similarly, the presence of a Colombian butterfly curator and Colombian butterflies was the reason Maria’s family, from the Latin American group, decided to visit the *Butterfly Worlds* exhibition at the Natural History Museum. Indeed, Maria argued that the Latin American community were far more interested in activities where they saw themselves represented.

During the Sierra Leonean focus group, participants talked about needing a reason that they could relate to before they would participate in museum visits or other PES opportunities. Kadiatu and Fatimata described this in terms of what people from the Sierra Leonean community would normally do in relation to engaging with museums and science centres:

Kadiatu: I would say half of the Sierra Leonean community, they never just sit down and say ‘let’s go to the Science Museum’

Fatimata: No they wouldn’t

Kadiatu: Maybe if it’s Black History Month you might say ‘let’s go to the Black History Boat [...] to go and see who this was like during slavery and all that’, because that’s educative to us, that’s where we came from, that’s interesting to us, but like, Science Museum, oh my God!

In the extract above, Kadiatu differentiated between engagement opportunities and issues that she saw as relevant to herself and her community (Black History Month) and those that she felt were not (the Science Museum). For Kadiatu, science was not seen as something that she could relate to. Unlike Ibrahim, Kadiatu was part of a majority of participants who felt science was not for them. This finding does, however, relate to those described in Chapter 4, that

participants were keen to take part in activities that related to their positional identities and drew on their cultural heritage.

The relationship between motivation to participate and information as a necessary precondition was also involved in PES activities that were potentially more culturally relevant. For example, Maria cautioned that cultural relevance and the representation of community interests in PES without information and marketing would be make little difference to Latin Americans in London: “it’s more not knowing what’s in a museum, not whether they’ve got Aztec exhibitions and all that stuff, but our lot don’t know about it, they don’t think there’s anything in there that’s to do with them”. Thus participants were attracted to events they could relate to by virtue of seeing their own cultural heritage being portrayed, but noted, as highlighted earlier in this chapter and in Chapter 4, they needed background information in order to engage with such opportunities.

These findings suggests that an interest in the subject of an activity played a key part in whether participants saw PES opportunities as relevant to their lives, as found in other studies (Calabrese Barton, 1998; Hidi & Renninger, 2006; Marres, 2005). Notable in these findings is, with the exception of one participant, the limited interest in science, combined with an emphasis on the relevance of cultural heritage and positional identities. What stands out about Ibrahim is that he identified with being a scientist, thus saw science content as relevant to him, and of interest, suggesting, therefore, that identity played a key role in both of the ways subject interest was described.

As suggested in Chapter 4, the question of relevance is an important part of how participation is framed, constituting one of the key ways in which participants identified with a given activity, as well as PES in educational, cultural and social contexts. Furthermore, as highlighted in Chapter 4, information was a crucial precondition to participation. Without the appropriate information, participants were unable to take up PES opportunities regardless of how interested they may have been. Ultimately however, participants felt the context of such PES activities was inherently unappealing. Therefore, non-participation in PES

activities in educational, social and cultural contexts can be understood as partly resulting from their disinterest in science, a perceived lack of relevance to their cultural backgrounds and the unappealing nature of the engagement environment, as well as from an underlying lack of information about PES opportunities.

#### **5.4.2 Eurocentrism and cultural imperialism**

Participants perceived museums, PES opportunities and their visitors as European. For many, scientific knowledge, the history of science and museums were seen as European. The overlap between both science and PES activities as culturally Western and European has been noted elsewhere (Aikenhead, 2002; Tlili, Cribb, & Gewirtz, 2006). As Mrs Mallick from the Asian group said, after describing history museums as being international she specified that science was a different kind of history: “some history, like science, this is European”. Thus, the history of science, and by extension, science museums, was perceived as culturally oriented towards Europeans.

Lucille and Hawa from the Sierra Leonean group made a related point: that museums in general and science museums, more specifically, are for Europeans. Furthermore, they perceived a negative bias in how African and Afro-Caribbean people were presented in science museums. In the following extract Hawa and Lucille drew on their knowledge of nursing to provide an example of how the presentation of the history of science seemed biased against African people:

Hawa: In reality, a lot of African Caribbean's have done a lot of things that are good in the world, [...] when you think about science in the museums, they are forgotten, maybe the only good thing they put about black people is in nursing, Florence Nightingale and Mary Seacole, or the slavery,

Lucille: Even Mary Seacole, it's a major example, Florence Nightingale, they portray her so much in the world,

Hawa: And Mary Seacole is forgotten.

Here Hawa and Lucille describe what they see as the biased presentation of two nurses in history, and argue that this is ethnically motivated. They also suggested that where the history of African or Black people does appear, it is focused on negative issues, like slavery, at the expense of more positive stories, such as the achievements of Mary Seacole. For Hawa and Lucille, both nurses, this example represented one way in which they did not relate to museums and similar institutions: they felt uncomfortable with the way Black and African people were represented.

Eurocentrism has been identified in research on the perceptions of non-visitors to museums and perceptions of science centres (Tissier & Singh Nathoo, 2004; Wellcome Trust, 2008). What Hawa and Lucille describe fits with arguments made by Young (1990b, 2000) and Benhabib (1996) about oppressive forms of cultural imperialism. Cultural imperialism is the representation of European or Western cultures at the expense of others (Said, 1993). Thus the experiences of Hawa and Lucille highlight the potential damage caused by Western cultural imperialism and Eurocentric assumptions in the presentation of science in PES institutions.

The issue of Eurocentrism also relates to questions raised in Chapter 2 about which forms of cultural participation are most valued in a society. From the perspective of some participants, Western, European and scientific cultures were the ones that counted for PES activities within museums and similar institutions. The privileging of European culture over others has been highlighted as problematic by researchers including Yosso (2005) and Levitas (2004) since it devalues the cultures of people from minority ethnic groups. The framing of educational, social and cultural PES opportunities as broadly European suggests this was a key way in which participants perceived PES was not for them. In terms of the discussion of cultural relevance in the previous section and in Chapter 4, the perception of PES as European can be understood as contributing to participants' disassociation from PES, and another reason for their non-participation.

Although Hawa and Lucille were critical of Eurocentrism in science museums there was a flipside to their argument. They simultaneously perceived cultural imperialism as providing certain resources. They felt that European scientific and technological knowledge could be usefully shared to help people in other parts of the world. So for Hawa and Lucille, cultural imperialism had some benefits. Khalid from the Somali group took this idea further. He positioned science and museums as British, but, drew on historical links between the UK and Somalia to make a case for why Somali people deserved to share British resources. From his perspective: “the UK has the resources and the power to provide the science and their culture to other cultures and should do so”<sup>9</sup>. This perspective drew on the idea of cultural imperialism but in a more positive way. Khalid saw the scientific knowledge and cultural practices of the UK and Europe potentially beneficial for people in other countries, and worth sharing.

Therefore, although participants noted Eurocentric tendencies in relation to PES in educational, cultural and social contexts, it is important to note this was sometimes perceived as offering certain benefits to people in and from less developed countries. There is, however, a tension between participants’ experiences of science and PES institutions as Eurocentric and oppressive and their claims on those same resources. This is the kind of tension Holland *et al.* (2001) describe as arising from the complex social positions and hybrid positional identities people occupy, especially, as in this case, people drawing on multiple backgrounds.

Participants drew on their minority ethnic identities to draw attention to the ways in which PES activities in educational, cultural and social contexts focused on European cultural heritage in ways they found problematic, while simultaneously noting the potential benefits of accessing cultural capital in the form of that knowledge. The tensions within this perspective echo themes described in

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<sup>9</sup> This extract is from field notes taken during an interview with Khalid. As mentioned in Chapter 3, he was happy for me to take notes, but not to happy to be recorded, therefore these notes are what Brewer calls “substantive field notes” (2000, p. 88) and summarise what Khalid said, but are not verbatim transcripts.

Chapter 4, in particular participants' recognition that the cultural capital potentially available to them through participation in PES might be valuable. Thus, the overlapping positional identities inhabited by participants meant they could appreciate the problems of Eurocentric practices and content in PES institutions and simultaneously believe such practices could be beneficial for themselves and others.

### **5.4.3 Children and learning**

Participants repeatedly framed PES activities in educational, cultural and social contexts in terms of opportunities for children, students and those who wanted to learn. While, as the quote from Thomas in section 5.4.1 suggested, not all participants believed participation in PES represented an opportunity to learn, it was a salient issue for a number of them. For example, participants from the Asian group saw going to museums, science centres, zoos, aquaria and similar institutions as something associated with childhood and learning.

For some participants the experience of accompanying their children to such places was their only PES experience. As Kadiatu from the Sierra Leonean group put it:

I went there [Science Museum...] because when my son was younger, I volunteered to take the kids [...] I've been to lots of places with them, I mean, as part of their school, [...] but I wouldn't just really get up and go on my own.

This extract shows how Kadiatu's ideas about educational, social and cultural forms of PES participation are framed in terms of school and childhood. She was comfortable with the idea of museum visits being part of school, to the extent that she volunteered to help with such trips, however, outside of school such trips were unimaginable. This theme emerged in every group; museums, science centres, zoos and other PES institutions were perceived as places for children to learn.



Participants described the childhood/learning framing of museums as one with lasting effects, similar to the enduring effects of school science experiences on attitudes to science. For example, Fatima from the Somali group described school visits to museums as something that put her off museum visiting for life. Fatima differed from other participants because she had visited several museums, science centres and a city farm and described liking science. However, she did not like science because of these experiences, but rather, in spite of them. Her experiences as a visitor to such places left her feeling at a loss to explain why her teacher insisted on such visits, concluding they were a kind of “punishment”, equivalent to “detention”.

Although Fatima had by far the most PES experiences of any participant, like other participants, she did not see her involvement in such activities as normal. Instead, for Fatima, PES was very much for other people: tourists and children. Given the way Fatima described her own dislike of such institutions, also striking was the fact that she reproduced her childhood/education framing of museum visits by taking her nieces and nephews on similar visits. She did so since she associated PES opportunities with learning, saying “even if I found it boring at the time, I did actually learn a lot”. Thus Fatima perceived participation in educational, cultural and social PES activities as both “punishment” and learning opportunity, such that she recreated those experiences for younger members of her family, despite her personal dislike of such visits.

Research has suggested school trips to museums and similar institutions benefit students from minority ethnic backgrounds and students from economically deprived areas (Hooper-Greenhill, Phillips, & Woodham, 2009). Fatima’s experiences, however, point in the opposite direction. In particular, her failure to understand why her teacher insisted on such visits suggests that Dewitt and Osborne (2007) were right to conclude that despite the large number of school visits to museums, such visits are rarely clearly organised. Although she was far from ignorant about museums, her visits with school had not resulted in a sense of confidence about how to use such institutions. For example, Fatima described not going to museums to research her ‘A’ level subjects because she “just didn’t

want to go into a museum, I didn't know where to start in a museum". This finding contrasts with suggestions that school visits to museums and similar institutions foster science learning and teach students how to use PES resources (Hooper-Greenhill *et al.*, 2009; Rennie 2007), suggesting instead that some students might not experience the benefits such visits may offer.

It is to be expected that visiting science centres, science museums and similar institutions with schools results in these institutions being framed in terms of school, learning and young people. School students make up a vast proportion of participants in PES activities; "over 1.5 million school children visit the UK's Science and Discovery Centres annually" (Ecsite-UK, 2008, p. 11). Whether participants had themselves been involved in such visits through school, or their children were, the school context framed how they perceived such institutions, and the opportunities afforded therein.

It is notable that participants with little or no PES experiences framed educational, social and cultural PES opportunities in terms of youth and learning because this reflects the dominant framing of museums, science centres and similar activities within the literature. This may represent a significant success for practitioners and policy makers within the field of PES; even non-participants in PES frame such opportunities as related to childhood and learning. However, this framing is not without problems. For example, seeing PES opportunities as something for children and students represented another facet of disassociation from PES. Participants did not see themselves as children or as particularly interested in learning science, thus PES opportunities were not relevant for them.

Not only did participants frame PES opportunities in terms of young people, school students and education, but science was framed in a similar way, as discussed earlier in this chapter (see section 5.2.1). For participants in all four groups, school experiences had a long lasting effect on their attitudes towards science. Their views followed a similar pattern to Fatima's experiences of PES opportunities; that science was something for children, was school based, and was something people became less engaged with or interested in, with age. Thus

PES opportunities, science centres and science museums were doubly framed by participants through a childhood/education lens, in terms of their science content and their institutional roles. This double framing reinforced the extent to which PES opportunities in educational, cultural and social contexts were perceived to be places for children rather than for adults. The double framing also suggests that that these contexts are ones which have particularly enduring legacies for non-participation in PES, in ways similar to the effects of school on attitudes towards science (Osborne *et al.*, 2003).

### **5.5 Habitus and disidentification with science**

This chapter explored the views and experiences participants had of science and PES. Most participants had little or no direct experience of PES and drew on other experiences, such as science in school or imaginary museums, to describe their views towards science and PES. Of all the forms of PES participants discussed, museum experiences were the most recognised category, and sometimes the only recognised form of PES. Nonetheless, museum visits were not common amongst participants. This analysis suggests that participants felt disconnected from science and PES in many ways, and were disposed against participation in PES. In other words, non-participation in PES was part of their habitus.

The findings of this study suggest that participants' attitudes towards PES drew on their experiences of marginalisation. For example, that they felt unable to effect change in political PES contexts and described PES in educational, social and cultural contexts as containing off-putting classed and Eurocentric elements. Participants described feeling that neither science nor PES were for them, and experienced disassociation from science and PES in numerous ways. As a result, these disassociations overlapped such that participants' disinterest in science compounded their perception of the irrelevance of museums, or their feelings of political disenfranchisement. This finding follows arguments made in Chapter 4; disassociation or disidentification from science and PES results from multiple and overlapping factors.

For participants, this multiple disassociation from science and PES resulted in dispositions against participation in PES that appeared to be resilient. Habitus is “the disposition that generates meaningful practices and meaning-giving interpretation” (Bourdieu, 1984, p. 166). Habitus, structured by experience, helped participants to pick out aspects of new situations they could connect to, and around which they developed new opinions or behaviours. Non-participation in PES was an affirmed part of their habitus and was compounded by the numerous ways it was reinforced, for example, by the combination of the view that learning science was for children, with the perception that PES was of little cultural relevance. This finding suggests that disidentification from science and PES was a significant part of participants’ habitus that would go on to structure their future experiences, and can therefore be considered relatively durable over time.

Participants’ disassociation from PES was not always simple. Mr Bhakta, Fatima and Ibrahim differed from other participants because they were interested in science, but this did not translate into participation in PES. The descriptions and stories participants told demonstrate additional contradictions. For example, some participants simultaneously held positive and negative attitudes towards school visits to museums. These contradictions suggest that participants negotiate complex, fluid and multiple attitudes towards science and PES. Understanding this finding from a theoretical perspective requires a view of identity that recognises complexity and the interrelated nature of social positions.

Roth (2008) has argued that cross-cultural divides are encountered by all science students in terms of the cultural differences between home and the science classroom. These cultural differences are exacerbated for students from non-dominant cultural backgrounds and for those whose structural positions result in marginalisation (Lemke, 1990; Ogbu, 1992; Roth, 2008). This perspective is in line with research by Yosso (2005), Calabrese Barton (1998) and Aikenhead (2002) that has suggested that people struggle to relate to culture and science, whether in school or PES activities, on the basis of social positions that differ from those favoured by the context in which they experience science. For

example, participants in this study felt upper and middle class social positions and European cultural backgrounds were favoured by PES contexts, and, partly in response to that, felt PES was ‘not for us’.

For Roth (2008), engaging with science from a marginalised social position results in cross-cultural differences that require considerable negotiation and produce multiple, heterogeneous identities. Similarly Holland *et al.* (2001) suggest that people frequently face situations of contradiction, where one or more aspects of their positional identities conflicts with another aspect. As a result, they suggest people draw on previous experiences to develop new attitudes or behaviours. Such tensions can be seen in the case of Fatima, who described a strong interest in science and a severe dislike of museums, but took her nieces and nephews to PES activities in educational, social and cultural contexts.

It is also important to note that not everyone may be able to negotiate these contradictions easily. Ogbu (1992) has suggested that disidentification with science, science education, and potentially in the case of participants in this study, disassociation from PES, may be considered agentic. Ogbu’s work offers an interesting perspective on the findings of this study and suggests participants may have developed a sense of disidentification from science and PES in order to articulate their experiences of marginalisation, and potentially, to resist them. By describing themselves as disinterested in science, participants may have been constructing positions from which to reject science and PES, while at the same time, acknowledging the ways in which they were excluded from these practices.

Patterns of disidentification based on social position have been found in research exploring the relationships between science education institutions, such as schools, and minority ethnic students, female students and students living in poverty (Calabrese Barton, 1998; Ogbu, 1992; Solomon, 1997). Similar classed, ethnic and gendered patterns of participation and disassociation have been found in relation to PES experiences in educational, cultural and social contexts (Borun, 1999; Dancu, 2010; DiMaggio & Ostrower, 1990; Fenichel & Schweingruber, 2010; Rahm & Ash, 2008; Tissier & Singh Nathoo, 2004). As Rahm and Ash

(2008, p. 60) note, in relation to participation in PES opportunities, “many ethnically and linguistically diverse youth from low-income backgrounds are positioned as ‘problems’ by the system, which then results in the positioning of self as outsiders”. Thus existing research supports the finding of this chapter that people from disadvantaged social positions may disassociate from science and participation in PES. The analysis presented here extends research on PES by empirically detailing how participants from disadvantaged social positions developed and framed their own non-participation in PES.

It remains difficult, however, to position the views and experiences of participants in this research, and their disposition against PES participation in terms of the views and experiences of other people. For example, research on public attitudes to science suggests that science is perceived by many as difficult to understand and that socio-scientific issues are often seen as too complex and overwhelming (Ipsos MORI, 2011). The patterns of disidentification noted here have also been found in research on the views and experiences of a mixture of students at different levels of science education (L. Archer *et al.*, 2010; Shanahan, 2011; Tonso, 2007). This patterns of disidentification found in other research suggest that even for groups whose social positions are not marginalised, attitudes towards and experiences of engagement with science, at least in a school setting, retain characteristics of classed, ethnic and gendered discrimination. Thus, while this research shows that participants’ dispositions against participation in PES were influenced by their experiences of marginalisation, such views may be more widespread.

As with the analysis discussed in Chapter 4, attention must be paid here to the balance of structured limitations and personal habitus. It is understandable that participants who dislike science, dislike museums and do not believe they can influence politics, do not participate in PES activities. These steps follow one another neatly. Most participants talked about PES, science, museums and politics in this way. Put like this, it seems to be a discussion of people and the choices they make, a discussion of agency. If people are not interested in PES, it makes sense that they would not participate; why should they?

This question focuses our attention of the issue of choice, which lies at the heart of questions about non-participation in PES. Participants expressed disinterest in science, socio-scientific issues, PES in a political context and PES in educational, cultural and social contexts, but also perceived these fields as something they had little or no place in, they were ‘not for us’. Thus, tensions arise from attempting to understand how much or how little choice participants had in constructing their attitudes towards science and PES and their participation in such fields. These tensions are especially important when the findings from this chapter are understood alongside the analysis presented in Chapter 4. Taken together these two analyses suggest that non-participation in PES results from a mixture of structured limitations and habitus, which influence one another and reproduce cycles of disadvantage.

One implication of these findings is, therefore, that the resilient disposition against participation in PES held by participants was related to their disadvantaged social positions in multiple and complex ways. For example, despite never having visited a museum, Thomas from the Sierra Leonean group assumed museums would not be welcoming or comfortable places. This finding suggests that other experiences in his life led him to take this view; experiences PES practitioners, policy makers and institutions may have little control over. Understanding disassociation from PES as the result of multiple experiences poses questions about the extent to which more inclusive PES practices can affect dispositions against PES participation.

Another implication of the analysis presented in this chapter, however, is that habitus is formed from a fluid, ever developing set of references and opinions. Theorising habitus as a tool for the on-going negotiation of the relationships between experiences and positional identities, as Roth (2008) and Holland *et al.* (2001) do, is particularly useful for this, more hopeful, perspective. If habitus is subject to change, changes in PES practice, such as improved information provision via targeted marketing or the inclusion of issues seen as culturally

relevant by people from minority ethnic groups, may over time, make a difference to the dispositions of non-participants.

## **5.6 Summary**

This chapter explored the views and experiences participants described about science and PES in both political contexts (such as policy consultations) and educational, cultural and social contexts (such as museums and science centres). The findings of this chapter suggest participants' habitus involved a resilient and durable disassociation from science and PES, resulting in their non-participation in PES. Participants saw science was "definitely not for me", participation in PES in a political context seemed pointless because "they're not going to listen to us", and museum or science centre visiting was "for people that already know about science".

Since the majority of participants had little or no experience of PES however, discussions of whether PES practices were off-putting were rarely able to draw on specific examples and relied instead on alternative experiences. This finding is important, since it suggests decisions not to participate in PES are often not based PES experiences. Nonetheless, what happens in practice may play an important role in participation, as others have suggested (Garibay, 2009; National Research Council, 2009), and remains unexplored as yet in this thesis. Therefore, Chapter 6 presents an account of how PES was experienced in practice by participants from each of the four groups, both during and after their visits, in order to explore practice contexts in more detail.



## **Chapter 6: PES in practice: Accompanied visits to museums and science centres**

### **6.1 Introduction**

This chapter focuses on the third research question of this thesis: how do people from socio-economically disadvantaged, minority ethnic groups experience PES in practice? To explore this question, the analysis presented here draws on data collected during and after four visits to museums and science centres. As shown in Chapters 4 and 5, participants had little direct PES experience to draw upon, and drew instead on other experiences in their lives to explain their views of PES. As a result, while some elements of PES practice, such as information provision and marketing, emerged as factors that contributed to non-participation, reflection on specific aspects of PES practice was limited. This limitation is to be expected however, some people may never experience PES in practice, being perhaps discouraged by school experiences of science, or museums, as suggested in Chapter 5, or limited by the relationships between their social positions and the structure of the field of PES, as suggested in Chapter 4. Nonetheless, understanding what happens in practice is an important part of exploring non-participation in PES.

In this chapter, four encounters with PES practice are analysed: the Sierra Leonean group's and the Asian group's visits to the Horniman Museum in South London; the Latin American group's visit to the Natural History Museum in West London; and the Somali group's visit to the Centre of the Cell in East London. The visits to the Horniman Museum involved the Natural History Gallery, the aquarium and other exhibitions chosen by participants, for example the African Worlds gallery or a hands-on workshop with natural history objects. At the Natural History Museum the Darwin Centre and Butterfly Worlds exhibition were visited. The Centre of the Cell visit involved a facilitated session with interactive computer exhibits. As outlined in Chapter 3, these visits were not analysed as comparative studies, since the participants and visit contexts were very different from one another. Instead the visits were used to explore a range of

PES practices in detail in different situations, through participant observation and participants' feedback in follow-up interviews.

Participants from each of the four community groups agreed to take part in a PES activity for this research (see Appendices 2 and 3 for more information about participants and visits). Political PES activities were considered but not ultimately chosen for research visits because, as discussed in Chapter 5, participants had little interest in them. As a result, this chapter focuses on participants' PES experiences at three museums and one science centre. Data from the visits were analysed to explore whether participants could access the exhibits, objects, concepts, interactives and workshops provided by the institutions visited, and whether the visits were learning experiences, as research on museums and science centres has suggested. However, participants experienced more than just the galleries and exhibits that I could observe and record their interactions with; they also travelled, ate, shopped, talked and reflected on their visits. Therefore, the second part of the analysis in this chapter concerns participants' feedback about the visits. The data extracts used in this chapter were selected for their illustrative qualities and a coding framework for this chapter can be found in Appendix 6, containing a summary of the themes identified, with descriptions and data extracts for each theme.

## **6.2 Museum and science centre visits: Learning experiences?**

As discussed in Chapter 2, researchers and practitioners have framed PES experiences in museums and similar environments in terms of social constructivist theories of learning. Thus, informal science learning institutions such as science centres or museums have been understood as cultural settings filled with props, prompts, information and explanations which provide opportunities for people to build on their existing experiences and perspectives and to develop new insights, often as part of a group. People are therefore understood to construct their own learning, supported by the various tools provided by the informal science learning setting. Applying social constructivist theories of learning to informal learning contexts suggests that, as Rahm has put it, "learning is best thought of as emergent and dynamic, and as distributed in the

flow of an activity and among activities over time and space” (2004, p. 241). Exploring whether such PES experiences can provide learning opportunities for participants is important in two ways. Firstly, because learning is the dominant rationale and frame for such activities within the literature, and secondly, because as shown in Chapter 5, this way of understanding PES activities in museums and similar environments has become so pervasive that even participants who have never visited such institutions describe them as places for children to learn about science.

The educational outcomes of PES experiences should not, however, be taken for granted. To paraphrase Dewey (1938), while we may learn from experience, not all experiences result in learning. Given the issues described in Chapters 4 and 5 regarding non-participation in PES, how participants might learn from a PES experience, and what they might learn, is of interest here. As Macdonald has suggested, exploring PES practice requires an investigation of “who is empowered or disempowered by certain modes of display” (1998, p. 4). Thus an important part exploring how exclusion from PES may be experienced in practice concerns whether or not learning opportunities are available and in what ways.

In order to explore whether participation in PES can be understood as a learning experience for people who do not normally participate in such activities, I adapted Falk and Dierking’s Contextual Model of Learning to analyse the visits. Falk and Dierking argue that people in museums “do learn, make meaning, and find connection” (2000, p. xiii). The model provides a useful framework because it takes into account the social constructivist perspectives on learning (such as the role of prior knowledge, behaviours *in situ*, collaboration with other people and objects) and positions them in a specific context (that of the museum or science centre), along with a broad definition of what learning might be. Falk and Dierking’s (2000) Contextual Model of Learning outlines three aspects of learning in museums; personal contexts, sociocultural context and physical context. They also suggest that a fourth aspect, time, is a crucial part of the process.

Personal context comprises “motivation and expectations, prior knowledge, interests and beliefs, choice and control” (2000, p. 137). Sociocultural context includes “within-group sociocultural mediation” and “facilitated mediation by others” (2000, p. 137). Physical context includes “advance organizers and orientation, design and reinforcing events and experiences outside the museum” (2000, p. 137). Using this theoretical framework meant the experiences of participants during the visits could be understood alongside existing research about how museum and science centre visitors learn during their visits to test assumptions made in the literature about the generalisability of claims made about learning in such institutions (Ash & Lombana, 2011). I focused on participants’ interpretive strategies to explore whether they could access, and therefore potentially learn from, exhibits. The visits were also examined through follow-up interviews, used to explore participants’ views of their visit experiences over time.

The visit data were not sufficient in depth to explore participants’ personal contexts or sociocultural contexts, although these are explored in Chapter 4 and 5, since the research visits represented only a snapshot of one event. However, where the Contextual Model of Learning has been operationalised in other studies, these aspects of the model were researched as observable behaviours, rather than broader aspects of visitors’ backgrounds. Thus sociocultural contexts, whilst theorised as the ways in which cultural and social norms affect learning, in practice became observable social interactions such as talk within a group at an exhibit (Falk & Dierking, 2000; Falk & Storksdieck, 2005). Thus, I analysed the visit data in terms of how participants connected with exhibits, rather than using the broader idea of social and cultural contexts. This process resulted in modifications to the way the Contextual Model of Learning was applied to the data (see Table 6.1). For example, rather than looking in detail at participants’ personal contexts as I did in the earlier chapters, I focused on how they used their personal resources to make sense of an exhibit.

In addition to the four contexts of learning theorised by Falk and Dierking (2000), another issue emerged from the data. There were occasions where participants

could not relate to what they encountered during a visit. In other words ‘not learning’, or more specifically, inaccessible learning opportunities, were present during every visit. Therefore, I modified the coding framework to include instances of inaccessibility, where participants struggled to make any meaning from what they encountered during an exhibition (see Table 6.1 for a summary of the coding framework and Appendix 6 for a more detailed version). The theme of inaccessibility arose alongside the other themes. It appears as a distinct category because it is more than ‘not-using-personal-resources’, rather it relates to the ways in which participants found an exhibit or what a member of staff said to be inaccessible. The four thematic categories (personal, interpersonal and institutional resources, and inaccessibility) arose in the data from all four groups, but to varying degrees. In this section, each category is presented in turn, and the implications for learning and social exclusion are explored.

**Table 6.1: Coding framework summary for visit data**

Interpretive strategies: How people related (or not) to what they encountered in the museum/science centre		
Contextual Model of Learning category	Modified category	Modified category description
Personal contexts	<b>1. Personal resources</b>	Use of personal experiences, knowledge, skills and/or ideas to make sense of an exhibit. For example participants sang and danced to make sense of some exhibits.
Sociocultural contexts	<b>2. Interpersonal resources</b> <b>2.1.1 Within group /Personal</b> <b>2.1.2 Within group</b>	Combining resources with other people to make sense of an exhibit. For example, one person helping another to understand a display using their own skills or knowledge,

	/Institutional <b>2.2</b> Institutional/science centre staff	people helping one another use institutional resources or a staff member helping someone to understand an exhibit.
Physical contexts	<b>3.</b> Institutional resources	Use of the interpretive resources of the museum or science centre to make sense of an exhibit. For example using a computer interactive or reading a text panel to find information about mosquitoes.
[absent]	<b>4.</b> Inaccessibility	Occasions where people could not make sense of what they encountered during a visit. For example, when people could not use a computer interactive (institutional resources) or their own background (personal resources) to use a microscope.

### **6.2.1 Using personal resources to relate to exhibits: Dancing with natural history**

In three of the four visits, occasions were identified where participants connected with the exhibits they encountered by using their personal resources, without using the interpretive materials provided by the institution (such as labels, leaflets, staff members, interactives and so on). It should be noted that the exhibits themselves constitute an interpretive institutional resource, since they are designed, lit and placed purposefully to attract visitors and aid learning. Instances where identifiable exhibit design issues affected participants will be discussed later (see sections 6.2.3 and 6.3) while this section focuses on the ways participants used personal resources to connect with exhibits.

The use of personal resources was the most identified interpretive technique used by participants, with the exception of the Somali group. For example, while

participants from the Asian group were in the aquarium at the Horniman Museum, Mrs Mallick recognised fish from Bangladesh and Ali told stories about fishing in Kenya when he was a child. In the Natural History Museum the Latin American group visited the Cocoon and Butterfly Explorers exhibitions, where previous encounters with the animals and plants on display were talked about in ways that related the exhibits to their own lives. Similarly, during their visit to the Horniman Museum, participants from the Sierra Leonean group told similar stories, relating what they saw to experiences at home in Sierra Leone and London. At one point, for example, Lucille and Mama Kamara had a long discussion in Temne (which Lucille kindly explained to me in English) about Mama Kamara's hip replacement operation, while looking at a human skeleton and pointing to the bones that hurt. These occasions were coded as 'personal' because participants related to exhibits without reference to any additional interpretive resources provided by the institution.

Participants used their personal resources to connect to exhibits in a number of ways, for example, they told stories and shared language skills. The Sierra Leonean participants not only talked about exhibits but danced and sang as a way to relate to objects they encountered at the Horniman Museum. At the exit to the African Worlds Gallery one of the group recognised objects related to female circumcision rituals in Sierra Leone and Kenya. As Lucille started to shepherd the children to the next gallery I turned back to see the older women had started singing and dancing. Hawa told me that they were dancing the ceremony for female circumcision. They explained to me, with Hawa translating, what the dance was for, when they did the dance and how important it was. After the dancing finished we moved on to the Natural History Gallery where within five minutes another dance started. In the extract below Hawa, Mama Kamara and Mama Sesay explain how the bird on display featured in their lives and related to their dancing and singing:

Hawa: It's a song for that [...]

Mama Kamara: For these two birds. When you sing, go to society, people eat for you (sings a bit of the song as illustration), you know that cassava?

Emily: Yeah

Mama Kamara: They boil it, and dry it, the cassava, when they dry it, that's what we call [acolopala]

Mama Sesay: Because it's stronger

Mama Kamara: But they have to cook it and stew it before eat

Mama Sesay: Yeah, this one (points to one of the birds), the dry one, so they dry it, they boil it with dry cassava.

Seeing the birds prompted the women to perform the ceremonial dance for the festival involved with hunting and eating the birds on display. The women clearly enjoyed themselves, dancing, singing, laughing and talking.

As Rice (1992) has argued, Western culture emphasises looking at objects, but in other cultures such objects are to be “be danced with, prayed with, healed with, used in everyday life” (p.146). Thus the singing and dancing of the Sierra Leonean group can be understood as an interpretive strategy. They used their personal resources and skills such as dancing and singing to understand what they encountered in a way that was culturally appropriate for them. Relating the exhibits to rituals they were familiar with through dancing and singing can also be considered as an example of polysemy, in other words, how people are able to develop their own interpretations of media like museum exhibits based on their personal backgrounds (Hooper Greenhill, 1995). While exhibits are designed to be interpreted in particular ways, visitors may bring their own experiences to bear on their personal interpretations in ways that are difficult to foresee, such as ritual dances and singing. This finding suggests that exhibits that are open to multiple



interpretations create opportunities for visitors with different cultural backgrounds to connect with museums or science centres and their content.

Participants' feedback, however, highlighted their fear that their dancing was misinterpreted. Hawa from the Sierra Leonean group explained on behalf of the older participants that "they show some concerns about how you may have perceived them when they were singing and dancing". As Worts has pointed out previously, while the ways in which people relate to objects cannot be controlled or prescribed: "museums can, however, be supportive of visitors as they personalize their experiences" (1996, p. 123). The experiences of the Sierra Leonean group highlight therefore, a problematic aspect of the use of personal resources to connect to exhibits; it was important for participants to feel comfortable enough to make their own interpretations, and not, as Hawa later concluded, to feel that they got "carried away".

During the visit to the Centre of the Cell, participants from the Somali group, unlike the other groups, did not use personal resources to connect with exhibits. Participants' frustrations at not being able to use or relate to the computer interactive exhibits were evident during the visit, telling each other the exhibits were "confusing" and repeatedly asking for help. Unlike participants from the three other groups, Somali participants were unable to use their personal resources to make sense of exhibits. While the different experiences of the Somali group result from a number of factors, it is worth noting that their difficulty using personal resources may have stemmed from the nature of the gallery they were in. Unlike the other visits, the Centre of the Cell gallery contained computer screens with information about scientific research and no objects or specimens. In contrast, all the other visits involved galleries with objects. In many cases those objects were animals and plants (living and dead) and they may have been easier for participants to relate to. Nonetheless, the inability of participants from the Somali group to use their personal resources to relate to exhibits suggests that personal resources cannot always be relied upon as a point of connection or understanding during PES experiences.

The use of personal resources to connect with exhibits suggests four key points. Firstly, three of the four groups of participants were clearly able to use their personal resources to relate to exhibits in ways similar to those identified through research with museum visitors (Falk & Dierking, 2000; Hein, 1998). This finding suggests that personal resources provide a powerful way for people who do not participate in PES to relate to museum and science centre experiences, and potentially, to learn and develop cultural capital. The implication, therefore, is that assumptions made about the learning opportunities of PES activities in educational, cultural and social contexts may be true for some people who do not typically participate. Secondly, since the Somali participants were unable to draw on their personal experiences to make sense of exhibits, caution must be exercised when suggesting personal resources form a platform from which *everyone* can relate to a museum or science centre experience. Evidently it is possible that, like the Somali participants, people might visit a PES institution where they cannot rely on their personal resources to understand the exhibits they encounter. Therefore, while personal experiences may provide a strong basis for some people to make sense of PES experiences, this may not always be the case. This finding suggests that a key element of the Contextual Model of Learning is limited; while personal contexts are an important part of learning, not everyone may be able to relate their personal contexts to PES experiences in ways that allow them to use personal resources to learn from PES opportunities.

The third point is that care must be taken not to overstate the role personal resources can play in PES experiences. For example, while personal resources provided a basis from which participants could connect to and understand exhibits, without additional resources their ability to learn anything new, or accrue additional cultural capital was restricted; personal resources have their limits. Fourthly, and finally, the use of personal resources to make sense of visit experiences in three of the groups suggests that this may be a valuable way for PES institutions to develop inclusive practices. For example, the Sierra Leonean participants were sufficiently moved by two exhibits that they sang and danced, while others talked of 'home' and used their 'home' languages. Participants

therefore created what Roth (2008, p. 893) has called “cultural bricolage” or “diasporic experiences”.

The idea of cross-cultural ‘bricolage’ or hybridity is important in terms of the differences between participation in PES and participation in community-based cultural practices analysed in Chapter 4. For example, research by Roth (2008) suggests that understanding science learning as a diasporic activity allows us to recognise the different contexts involved when people participate in PES activities. In the case of the accompanied visits described here, when using personal resources to make sense of exhibits, participants drew on their transnational backgrounds and positional identities to connect with a PES activity, creating multiple interpretations of exhibits. Polysemy represents a potential way for PES experiences to become more relevant for participants: by building on connections to people’s positional identities and transnational cultural backgrounds.

As Rahm has suggested “the meaning of objects in museums are up for negotiation by visitors in ways not often the case in other contexts” (2004, p. 241), as was evident with the case of the Sierra Leonean participants and the bird on display at the Horniman Museum. Building on these ideas from Roth and Rahm, this analysis suggests that some activities may represent potentially relevant and engaging ways for people from socioeconomically disadvantaged and ethnically marginalised communities to participate in PES. As highlighted by the experiences of the Sierra Leonean participants, drawing on personal resources and creating diasporic encounters in science museums was not without its drawbacks: participants felt the way they connected to certain exhibits was unusual, concluding their behaviour was inappropriate and that they were “carried away”. This finding suggests that the extent to which they felt comfortable creating cross-cultural meanings in PES contexts were limited.

### **6.2.2 Interpersonal resources: Collaboration with friends, family and staff**

Another way in which participants made sense of the exhibits they encountered was through interpersonal or social resources, in other words, by working with

other people. Participants in every group worked together, and in some cases with members of staff, to find ways to connect with exhibits. Because all the visits were social events, the use of interpersonal resources was only coded when participants were working together to understand or relate to an exhibit. Three different ways in which participants worked together were identified; firstly, occasions where participants helped others in the group relate to an exhibit using their personal resources; secondly, occasions where participants helped others relate to exhibits using the interpretive materials provided by the museum or science centre (institutional resources); and thirdly, occasions where staff members helped participants relate to museum objects or exhibits.

Examples of participants helping one another understand an exhibit occurred in every group, for example, when Ignacio from the Latin American group told his daughters stories about scorpions in Colombia while looking at specimens on display in the Cocoon gallery, or when Lucille, from the Sierra Leonean group talked about Egyptian Mummies with her children. In the extract from the Latin American group talking in the Natural History Museum below, Ignacio tells Sofia what Cocoa was called where he grew up in Colombia:

Sofia: That's the cocoa

Ignacio: I saw sometimes in the forest, the fruit, the fruit is for eat,  
[ochuas], this is the name

Sophia: [Ochuas]

Ignacio: That's it

Ignacio related the Cocoa exhibit to his previous experiences and used it as an opportunity to teach Sophia the Spanish name for cocoa. As in the previous section, this extract can also be understood as a moment of cross-cultural meaning making where different contexts and transnational experiences are pulled together prompted by an exhibit.

Participants in every group also helped one another to make sense of exhibits using the interpretive materials provided by the institution they were visiting, such as gallery texts, computers or handheld interactives. Other examples involved one participant reading institutional text aloud for others. When participants translated the language of museum materials (staff talk, labels or computer interactive instructions) the action was also coded as within group use of institutional resources.

Interactions with members of staff formed a third way in which interpersonal resources were used to relate to exhibits in two of the four visits. For example, during the Asian group visit, participants asked staff members in the aquarium detailed questions about the fish and how they were looked after. Similarly, during the Asian and Somali group visits, staff delivered timetabled workshops as part of the experience. Comparing these two experiences reveals striking differences. The Asian group's hour long workshop at the Horniman began with a member of staff introducing various objects from a handling collection, for example, a shark's jaw, a chicken skeleton and a stuffed fox, and asking the group questions about these objects. She checked with the group if she was talking too fast and encouraged within group translation. After 10 minutes the group were talking amongst themselves, exploring objects on their own and asking the member of staff their own questions.

In contrast, the facilitation of the Somali participants did not create a comfortable environment for their visit to the Centre of the Cell. For example, the Somali participants struggled to answer the facilitator's questions and responded with difficulty to questions about what they were studying at college and what career plans they had. These questions seemed confusing to participants since they were adult women who were not studying and already had jobs. Throughout the visit the facilitator or the computers in the 'pod' would demonstrate an activity and participants would try and follow the example, with little further interaction between the participants and the facilitator during the activity. This was striking since the participants struggled with all the activities they were presented with,

and the assistance of the facilitator could have been helpful. Similarly, during the Latin American participants visit to the Butterfly Explorers exhibition at the Natural History Museum, staff repeatedly asked participants not to touch the butterflies. This staff behaviour was repeated several times until Maria became offended. In contrast, during the Sierra Leonean participants visit to the Horniman Museum, there were no interactions with staff. Thus, across the four groups only one had a positive interaction with staff members, while two groups felt uncomfortable as a result of their interactions with members of staff, and the fourth group encountered no staff members.

The use of interpersonal resources by participants to make sense of exhibits is important in two ways. Firstly, as with participants' use of personal resources, the use of interpersonal resources is in keeping with research on existing museum and science centre visitors. For example, other researchers have also found that visitors help one another access exhibits, share their own knowledge, work to overcome accessibility issues and learn from exhibits together (Borun, Chambers, & Cleghorn, 1996; Falk & Dierking, 2000; Lehn, Heath, & Hindmarsh, 2001). Thus, participants used interpersonal resources to relate to exhibits in ways that are similar to the techniques used by people who participate in PES more frequently. This finding is important because, again, it suggests aspects of existing visitor research may be more widely applicable.

The second implication of these findings is the importance of the role played by staff interactions for participants. In particular, that some interactions between staff and participants were unhelpful to participants. For example, by repeatedly reprimanding the two younger Latin American participants, staff may have contributed to a view of the museum as unhelpful, off-putting and unfriendly. Similarly the confusing and unhelpful interactions between the Somali participants and the facilitator at the Centre of the Cell created an uncomfortable environment for their visit, leaving them to conclude the activity was for not for people like them. As Ash and Lombana (2011) have noted in their research with Latino families unused to museums or science centre visiting, extra effort was needed on the part of families to understand how to behave and how to approach

exhibits. Appropriate support from staff members was key to helping those families enjoy a successful visit. Comparing the staff interactions experienced by the Somali group and the Asian group points to a similar finding; facilitation by staff can play a key role in helping or hindering participants make sense of their visit experiences.

### **6.2.3 Using institutional resources: Both help and hindrance**

The third element of how the accompanied visits were analysed focused on if and how institutional resources, such as texts or interactives, were used. Some participants were able to use the interpretive resources provided by the institution to understand exhibits. Participants used display labels and wall panels, members of staff (as discussed above), computer interactives and non-computer interactives to make sense of exhibits. For example, in the Butterfly Explorers exhibition, the Latin American group used large kaleidoscopes built to resemble a pair of glasses and designed to mimic how butterflies see. This was, therefore, an example of participants using an interactive to develop their understanding of an exhibit. Similarly during the Asian group's visit to the Horniman Museum, Mirza questioned a member of staff who was feeding the fish in the aquarium at length. This interaction was coded as the use of institutional resources (as well as interpersonal resources) because Mirza used the staff member's knowledge to make sense of the exhibits and to get new information.

Through their use of institutional resources to relate to exhibits, participants, in particular those from the Latin American and Asian groups, used the interpretive tools provided by the museums in the ways they were designed: to help them understand exhibits and, potentially, to learn. These are the intended aims of interpretive resources such as exhibit texts, interactives (whether computer based or otherwise), staff facilitation, exhibit design and layouts; they are created and designed to help visitors make meanings from exhibitions. By using these resources, participants were behaving in line with extensive research on how museum and science centre visitors use interpretive resources (Dierking & Falk, 2009; Heath *et al.*, 2005; Hein, 1998; Meisner *et al.*, 2007). The implication of this finding, as with those suggested in the previous two sections, is that

participants used personal, interpersonal and institutional resources to understand PES experiences in museums and science centres in similar ways to more frequent museum or science centre visitors.

A second implication of these findings, however, concerns the problems faced by participants unable to use interpretive resources, such as some of those from the Sierra Leonean and Somali groups. Being able to access new information is a key part of learning. As discussed in the previous section, participants did have enjoyable and meaningful experiences in museums and science centres using only their personal resources or interpersonal resources. However, accessing only one's existing knowledge, or that of one's companions, is limiting for any visitor.

Although there are some examples where participants from the Sierra Leonean and Somali groups were able to use institutional resources, these were few and far between. This finding is problematic because while members of the Sierra Leonean group enjoyed themselves and were able to use personal and interpersonal resources, the extent to which they could add to what they already knew was limited. By being unable to access institutional resources their visit experiences could not challenge their existing knowledge. As Roberts has argued: "It is this moment of conflict that is the business of education, because out of this conflict comes the need to consider the sense in which revised or alternative world versions may be valid" (1997, p. 133). As a result, Sierra Leonean participants' engagement with exhibits, and their ability to learn from them, was limited.

Participants from the Somali group were in a worse situation; they were not able to use personal or institutional resources to make sense of what they encountered during their visit. Furthermore, their use of interpersonal resources was severely limited since they were largely unable to help one another and their staff interactions were unhelpful. As a result, of all the groups, participants involved in the Somali visit were the most limited as they were unable to make sense of the exhibits they encountered. What these findings suggest is that the PES opportunities found in museums and science centres provide learning



opportunities for some participants but inhibited learning for others. These findings also suggest that while the Contextual Model of Learning can be applied to some cases, there are other cases where one or more elements of the model do not apply.

### **6.3 Inaccessibility: When physical access is not enough**

Thus far, the theme of inaccessibility has cut across the other ways in which participants interacted with exhibits and staff members. While the above sections suggested that some participants engaged with the visits to museums and science centres in ways similar to those found and theorised in the literature, this was not the case for all participants. Thus, while the theoretical framework derived from Falk and Dierking's Contextual Model of Learning provides a focus on how learning *does* happen, it is equally important in a study of non-participation in PES to examine where, how and why learning *does not* happen. Inaccessibility emerged as a theme in every visit. While some participants were able to relate to exhibits with personal, interpersonal and/or institutional resources, others in every group were not. Participants struggled to relate to exhibits in several ways, in particular exhibit design and museum layout, staff interactions and language access were key issues. In order to show the overlapping nature of the issues involved the experiences of participants from the Somali group at the Centre of the Cell are discussed, because their visit exemplified all of the issues involved with inaccessibility.

#### **6.3.1 A study of inaccessibility: The Somali participants' visit**

Notable in the Somali visit were the lack of coded instances of personal, interpersonal or institutional resources being used to connect successfully to the PES experience. The visit to the Centre of the Cell involved a staff facilitated session in an interactive 'pod', filled with computer interactives and audio-visual presentations. The staff facilitation available, the presentations, computer interactives and text were all in English, a language in which not all of the Somali participants were proficient. Furthermore, the facilitation style of the staff members and the design of the interactive computer exhibits, or 'games', as well

as the whole ‘pod’ environment created additional access problems for participants.

The design of the Centre of the Cell experience appeared to be organised for school groups of young students. This focus on students is in keeping with the aims presented on their website<sup>10</sup>, however, the website also claims to provide opportunities to “promote learning within the family and community”. Furthermore the Centre is located in East London, a multi-lingual, multi-cultural area of London, where after the visit, the participants stayed to go shopping in specific supermarkets where they could buy food from ‘home’. When I called to arrange the visit I was assured it would be suitable for the Somali participants. This did not appear to be the case. For example, participants could not ‘play’ the ‘games’ they were presented with on the interactive computer exhibits. The presentations and computer ‘games’ involved simultaneous audio and text instructions, which moved quickly, leaving little time for listening, reading and understanding. The difficulties participants experienced trying to follow the computer ‘games’ were exacerbated since all text and spoken instructions were in English. Furthermore, the interactive computer screens were designed as multi-user interfaces, which meant that, alone or in pairs, the Somali participants struggled to follow what was happening. In one game, for example, several images, numbers and text instructions were on different parts of the large screen complete with audio instructions, while overhead another voice announced the closing of the ‘nucleus’, accompanied by siren noises, background music and flashing lights. This may be a format that works well with groups of four to six people with fluent English, but it proved difficult for three adult Somali participants working on their own or as a group.

The ‘games’ not only raised design and language issues, but their content was confusing and upsetting for participants. One particularly inaccessible exhibit began by photographing Hamiido. However, the on-screen image of her face

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<sup>10</sup>Of the seven aims presented on the Centre of the Cell on the website five are explicitly focused on young people, one focuses on “the family and community” and one is about raising awareness of healthy lifestyles generally. See <http://www.centreofthecell.org/pages.php?pid=1> accessed 10.8.10.

promptly went up in flames, resulting in Hamiido crying “Ooooh, my God why?” As in other visits, the group tried to help one another make sense of exhibits. However, in this case, the group still struggled to make sense of the games’ instructions, including the aim of the ‘game’ and what to do once presented with the image of Hamiido’s burnt face, even with the eventual help of the staff member. This computer interactive may have been designed with young students in mind who may find it exciting, but it was confusing and upsetting for participants.

The issues of exhibit design, language access and exhibit content were further exacerbated by problematic interactions with the facilitator. On a few occasions I noticed the facilitator seemed to treat participants almost as if they were school students. This approach was notable in the way he asked about which schools or colleges they were at, repeatedly told them to be quiet and sit down, tested their knowledge, and talked about the ‘games’. For example, asking participants to “just stay in your seats for one moment” for a third time in a row, or telling them which ‘games’ to play. This approach exacerbated by the design of the experience where at regular intervals an automated loud voice would also tell participants to “return to your seats”. The designed environment in the ‘pod’ was not only bossy, but cold, dark and noisy, with occasional flashing lights and siren noises. This was a confusing environment, that may have been designed to be an exciting, immersive experience for young students, but appeared unwelcoming and confusing to participants, to the extent that during one over-head audio-visual presentation, one participant described feeling scared, while a sense of confusion about what was happening was commented on by participants throughout the visit.

Research has found first-time visitors to museums are often put-off by the disorientation they experience at confusing layouts and being unsure about appropriate behaviours (Ash & Lombana, 2011; King & Dillon, 2012). The visit experiences of Somali participants suggest this sense of disorientation is especially problematic for those without English language fluency, where little or no attempt at translation is made and staff interactions do not support the

experience. Not only were participants in a new and unusual environment, but there was little support available for them to understand what was happening, or how they were expected to respond. This account of the Somali visit to the Centre of the Cell raises several issues pertaining to inaccessibility: language access, exhibit and exhibition design and staff interactions. These issues emerged in every group to some extent. Sometimes the issues involved were relatively straightforward, such as an out-of-order exhibit, while other instances involved a complex overlap of several issues, as with the Somali visit.

### **6.3.2 Inaccessible by design: Exhibit design and staff facilitation style**

In every visit, some aspects of the visit experience were inaccessible by design. For example, some exhibits were designed in a way that meant participants struggled to understand how to use them. Participants in every group also found exhibits they described as too boring and too complicated. For example, Idyl from the Somali group described not being able to understand what she was supposed to do with the computer interactives in the Centre of the Cell: “I didn’t know what I was doing, I was just touching, sometimes I was winning really without knowing the reason why”. This is an example of what some have termed a “hands-on” but “minds-off” approach to science learning (Roychoudhury, 1994). While Idyl was physically in front of the computer interactive and was able to touch it, she did not understand what the purpose of the exhibit was, and thus could not make sense of it. For Idyl, not being able to relate to or make sense of exhibits was a frustrating experience. She elaborated, saying: “they throw you in the game and you don’t know where to start, it’s not something that you’ve done before, and by the time that you’re trying to understand the way the game works, the game’s over”. From Idyl’s perspective her confusion with the ‘games’ at the Centre of the Cell resulted from design issues: games were confusing with insufficient time or explanation provided. Similar instances were recorded during the three other visits.

While interactions with some staff members during visits were helpful, unhelpful interactions with staff members hindered participants’ efforts to make sense of an exhibit, or their visit as a whole. For example, interactions with the facilitator

created problems rather than solutions for the Somali participants. The staff member asked few questions about the group and instead posed questions about the content of the science centre and biomedical information. For example, participants were asked about cells several times, responding at each turn that they did not know about cells, until finally, one participant replied “I don’t want to tell you”. It appeared as though the staff member struggled to adapt his facilitation style to work with a group of adults who were not fluent in English and were not science students. As a result the facilitation style of the staff member appeared to be off-putting rather than welcoming for the Somali participants. This example of one facilitator at one PES institution indicates how important staff facilitation styles can be.

### **6.3.3 Linguistic diversity and inaccessibility**

Language issues arose as a cross-cutting theme that affected participants’ orientation to institutions as a whole, to exhibitions, as well as to specific exhibits and staff interactions. As outlined in Chapter 3 (section 3.5), English was a second, third, fourth or fifth language for participants. While participants were sampled on the basis that we could communicate with one another in English, this did not mean all participants were fluent English speakers. Language issues emerged as a key component of inaccessibility during the visits. For example, in the Asian group, some participants had to rely on others from translation during the hands-on workshop, and similar translations were needed in every group. However, even with the translation efforts made within groups, language problems made institutional resources inaccessible for some group members. For example, during the Latin American visit, Ignacio watched but could not help his daughters use computer interactives nor could he access text panels or interactives on his own. The audio and text instructions were in English and he had to ask for translations. Institutional reliance on English language thus prevented participants from relating to exhibits and from using institutional resources.

Linguistic inaccessibility was evidenced as much by what was not coded, as by what was coded. For example, the rarity of coded instances of participants from

the Sierra Leonean group using any of the museum's interpretive materials resulted from the limited reading English reading skills of some participants. Language formed a key accessibility issue for participants in terms of the design of exhibits, exhibitions and the layout of institutions. Participants in the Sierra Leonean group raised concerns about being unable to understand the layout of the Horniman Museum or, what they were supposed to do. For some Sierra Leonean participants, navigation was a two-fold problem. Not only could they not read the written instructions and signs, but they did not feel confident about asking for directions in English. For example, Mama Kamara and Mama Sesay concluded they would not feel comfortable returning to the museum without someone they knew to help them.

Without being able to read signs or ask for directions, the whole institution, not just the exhibit content, was inaccessible for Mama Kamara and Mama Sesay. Inaccessible language exacerbated problems faced by participants in every group in terms of accessing basic way-finding information, instructions or exhibit content. These problems have also been identified in research with people from linguistic minorities in the US, who needed additional time and support to understand both how exhibits and exhibitions worked (how to use a specific interactive) and what to do in general (how to behave in the institution) (Ash & Lombana, 2011).

That language issues pervaded instances of inaccessibility, echoes well-established findings in language, literacy and education research about the inaccessibility of educational institutions that provide resources only in the dominant status language, in this case English (Nichols, 1996; Rickford, 1996). Similarly Yosso (2005) has argued that discriminatory language practices constitute a key factor in what she calls the "racialized subordination" experienced by people in minority ethnic social positions. More specifically, the inaccessibility of particular exhibits, whole exhibitions, institutions and staff on the basis of language barriers has been suggested by research in the US as problematic (Ash, 2004; National Research Council, 2009). Furthermore, research found monolingual institutions were seen as unwelcoming, difficult to

use and unappealing by people minority ethnic groups in the US (Correa Zeigler, 2009; Fenichel & Schweingruber, 2010; Garibay, 2009; Yalowitz & de la Hoz, 2009).

This analysis demonstrates the extent to which not being proficient in the dominant language excluded some participants from PES opportunities, and especially from the aspects of learning afforded by being able to access new information via institutional interpretive resources. Language issues meant participants were limited in terms of the new information available to them, and in terms of feeling welcome and comfortable during their visits. Participants noted both the lack of alternative languages available and the difficulty of providing universal translations, highlighted in the literature (Fenichel & Schweingruber, 2010). Nonetheless, as Idyl from the Somali group concluded, language issues contributed to a sense of exclusion: “because people would think, oh there’s discrimination in here, it’s not designed for us”. Thus, for some participants, exclusion issues were visibly etched into the very fabric of the institutions we visited.

#### **6.4 Participants’ views of their visits: Social, educational and still ‘not for us’**

As well as exploring the accompanied visits through a detailed analysis of the possible meaning making opportunities participants encountered, the visits were also analysed in terms of how participants positioned their visit experiences within the broader contexts of their lives. This analysis was done using an iterative coding process as outlined in Chapter 3. The issue of time is raised in the Contextual Model of Learning (Falk & Dierking, 2000). Falk and Dierking, like other educational researchers such as Lemke (2000) and Wortham (2008) suggest that understanding the learning trajectories of individuals over time is an important part of understanding learning experiences. While it was not possible to conduct this study over a period of multiple years, follow-up interviews after the visits provided insights into how participants saw the visits. Exploring how participants perceived their visits enables these specific PES experiences to be positioned in terms of the broader context in which non-participation occurs and the ways in which participants did, and did not relate to science and participation

in PES. In other words, exploring participants' reactions to the accompanied visits over time helped to contextualise these visits.

During and after the visits, as well as in the months that followed, I asked participants what they thought of the visits in formal and informal conversations. Participants' initial comments were positive. Although the positive feedback should not be dismissed, a positive bias is possible, especially given that participants were being asked about a visit by the person who had organised it.

#### **6.4.1 The value of a visit: Visits as social and learning experiences**

In contrast to the identification of instances of inaccessibility and discomfort in the analysis of the visits, participants described their visits as enjoyable, social and educational experiences. Participants in every group highlighted their enjoyment of the social aspects of the visits, such as eating lunch together and spending time with friends or family. The visits were described by participants in every group as a "good day out".

Seeing the visits as a "good day out" fits with the positioning of museums and science centres alongside visitor attractions as described in Chapter 5. It also raises questions about the extent to which the institutions visited were themselves valued, or whether a visit to Madame Tussauds or a picnic in a park would have been similarly enjoyed. For example, in an interview, Mr Bhakta from the Asian group concluded that he simply liked having something to do: "we had a break from being indoors, going outdoors, which I liked the most". Thus, for Mr Bhakta, the value of the visit lay in doing something different. However, describing the visits as enjoyable glossed over distinctions between those who were able to make sense of what they encountered and those who were not. Although the Somali group had the most difficulty of all groups in making sense of any part of their visit, and formally and informally recalled a confusing and difficult experience, their feedback echoed Mr Bhakta's sentiments. Thus, despite the problems of their visit, Idyl, from the Somali group, concluded that she was happy to have done a new activity with her friends.



The visits were described as learning experiences to some extent by participants in every group. Participants talked about learning as something that happened during the visit, noted they had learnt from one another, and reflected on their interest in subjects on display and recalled the content of exhibits. For example, Mirza from the Asian group saw learning as a valuable aspect of the visit. She described her own interest in animals, recalled new information that she had learned during the visit to the Horniman Museum and highlighted learning as valuable and enjoyable. Mirza described the use of personal resources (her own interest in animals), interpersonal resources (working with other group members to talk about fish) and talking with a member of staff, both a group and institutional resource, as elements of her learning experience. In these ways, the experience Mirza described can be understood using the Contextual Model of Learning (Falk & Dierking, 2000).

The framing of visits as social and learning experiences, maps onto existing research about such visits. For example, research with other museum and science centre visitors has found people see their experiences as educational in both cognitive and affective ways, sociable and enjoyable (Borun *et al.*, 1996; Dierking & Falk, 2009; Hein, 1998; King & Dillon, 2012). Furthermore, these findings back up research that has suggested the social and learning aspects of such visits cannot be separated, since in these data, both themes emerged together, as a double framing of the visits (Zimmerman, Reeve, & Bell, 2010). These findings therefore suggest that participants saw their visits as social, learning experiences in ways similar to how such experiences are framed by other museum and science centre visitors.

In addition, participants also described feeling that their own knowledge had been legitimised through their visit experience, especially where they could make connections with their own backgrounds. In every group participants talked about remembering their 'home' countries as part of their visit experience. For example, recalling the aquarium at the Horniman Museum, Mama Kamara, from the Sierra Leonean group, related the animals, fish and water on display to her life in Africa:

Then I saw the monkey, the baboons, the fish, and different things, ah, many things we saw, then I remember back home, when we see these, when we see the fish, we go out fishing to catch them, and eat, we see the water and we say, this [is] like Africa.

This finding is perhaps obvious given the extent to which participants relied on their personal resources to make sense of exhibits, and the problems they faced accessing institutional resources as a result of language issues. Nonetheless, this finding highlights again the issue discussed in section 6.2: the visits provided participants with opportunities to draw on their transnational and positional identities to create learning opportunities.

Visits, therefore, afforded hybrid learning opportunities as participants drew on their personal resources to identify exhibits that they could relate to. That participants remembered the visits in terms of the exhibits, content or objects they had been most able to relate to during their visit is in line with the application of constructivist learning theories to learning in museums (Falk & Dierking, 2000; Hein, 1998). What this analysis adds however, building on the work about the role of identity in learning science (Aikenhead, 2002; Roth, 2008; Roth & Tobin, 2007), is that the visits afforded opportunities for cross-cultural exchange, that is, participants drew on their transnational backgrounds to make new, hybrid meanings from exhibits. From this perspective the visits provided valuable opportunities for participants to make sense of these institutions and their scientific content in new ways, for example, by dancing ritual ceremonies around natural history exhibits. However, this may represent an overly positive interpretation of events, as the earlier analysis of the visits suggests.

There are several problems with taking participants' descriptions as given. Firstly, as highlighted by the mismatch between the instances of inaccessibility found during the visits and the reports of learning through visits, self-reported data about learning must be examined in light of the analysis of what happened during the visits. Secondly, as suggested earlier, there is a likelihood of a positive

bias in the feedback data. This potential bias may account for the positive response of Somali participants to their visit, despite the visit itself appearing highly problematic. Thirdly, as noted in Chapter 5, the educational framing of visits to museums and science centres existed for participants prior to the visits being carried out. It is difficult, therefore, to attribute this framing entirely to the visits themselves. Finally, as will be discussed in the following section, additional, more problematic framings of visits overlapped with positive views of visits in ways that highlight how issues of inaccessibility and exclusion affect non-participation, even when the benefits of participation are recognised.

#### **6.4.2 Opportunity costs: Visits as exclusive and inaccessible**

As well as framing visits as social and educational experiences, participants simultaneously described visits as exclusive and inaccessible. They suggested that the institutions we visited were not comfortable places for them. As outlined in section 6.3.3, participants noted their language difficulties in the institutions we visited. These not only prevented them accessing specific exhibits and interacting with staff members, but also contributed to a sense of discomfort and confusion within the institution. Participants described additional signs that signalled to them the institutions were ‘not for us’. For example, participants commented on not seeing other people like them. Ignacio from the Latin American group was clear about how few families like his he noticed at the Natural History Museum:

Ignacio: For example, we went to the butterflies museum, I don’t see, maybe one or two families, Latin families there, you see anywhere, or no?

Emily: I didn’t

Ignacio: Exactly.

To Ignacio, visiting museums was something Latin Americans in London simply did not do, and this perspective was reinforced for him by the Latin American

families missing from the museum. Participants noted other signs that the PES institutions were not for them. For example, members of the Asian and Latin American groups discussed concerns about being able to find the right kind of food in the institutions we visited.

The financial costs involved in the visits were seen as too high by all groups. Particular references were made to transport, cafes, gift shops and entrance fees, although with the exception of gift shops, these costs were covered by the project. Participants felt the institutions visited were expensive places, too expensive for them. As Maria from the Latin American group put it: “that’s really excessive, charging that much for a sandwich, it’s just so much [...] they’re ripping us off, it’s a bit bad that”. Participants from the Somali and the Latin American groups linked the expenses they noticed during the visits to the idea that such places must be for tourists and rich people. In the following extract, Sofia from the Latin American group explains that the costs associated with a visit could become insurmountable:

Having a trip out for a day costs a lot more money than you think, even if it’s initially free to get in, you’re talking travel, food costs, going into the gift shop, all of that, so I think people who’ve got higher incomes, it’s not really an issue, whereas for other people, ‘oh well, there’s however many of us, that’s going to add up’.

Sofia identified the costs associated with a ‘trip out’, concluding that while it might work for people with ‘higher incomes’ it was a problem for people like her. Being excluded from museums and science centres because of costs, especially the multiplication of costs involved in large group visits has also been identified elsewhere (Garibay, 2009).

The disassociation from PES described in Chapter 5 was echoed in how participants described the exclusive elements of the accompanied visits. Participants saw the institutions visited as too expensive for them and suggested such opportunities were for tourists or upper and middle-class people. In addition,

the museums and science centres visited were described as places for people who already understood how the institutions and the exhibits worked, people who were already used to visiting similar places. These findings echo research carried out in London about non-participation in museums, that also found people from minority ethnic backgrounds saw such institutions as something for other people, but not for them (Tissier & Singh Nathoo, 2004).

The issue of feeling at home, or feeling comfortable, combines all of the issues of accessibility and inaccessibility raised in this section. Through research with low-income Latino families in American PES institutions like aquaria and science centres, Ash and colleagues (Ash, 2004; Ash & Lombana, 2011) established that visits to such institutions required additional work, effort and support in order for families to understand how to behave with exhibits and institutions as a whole, especially language support. Similarly, other research with Latino, Native American and Vietnamese communities in the US, and culturally, linguistically and economically marginalised groups in Canada suggest these visitors (or non-visitors) need additional support to participate in PES activities in educational, social and cultural contexts (Fenichel & Schweingruber, 2010; Garibay, 2009; National Research Council, 2009; Rahm & Ash, 2008). In the visits described in this chapter, a key issue raised by the theme of inaccessibility concerns the extent to which participants felt able to behave in a way they felt was comfortable and appropriate. Thus, despite valuing the social and educational aspects of their visits, participants also noted the ways in which they felt such institutions were inaccessible for them.

Participants suggested they were unlikely to return to a museum or science centre in the future. Future visits were contingent upon an unrealistic, almost impossible alignment of factors. Idyl from the Somali group, for example, when asked about whether she might visit the Centre of the Cell again responded: “maybe yes (laughs) but if you didn’t have anywhere else to go”. She suggested that she would only return to the Centre of the Cell if she had nowhere else to go and concluded that with other options available: “then I wouldn’t put that [Centre of the Cell] first”. This finding suggests that despite positive aspects to the feedback

from the Somali participants about their visit, they did not see the Centre of the Cell as something that was likely to become part of their lives. Furthermore, the Somali participants emphasised their lack of free time in general; PES participation was only possible if they had free time, which they did not. Participants in the three other groups suggested returning to a museum or science centre rested on having enough time and being taken there again by family or another community centre, but although this was discussed as a possibility, participants agreed that it was unlikely to happen. Reasons given for continued non-participation were, as discussed in Chapter 4, work demands, organisational difficulties, distance and different priorities for their time and money.

Participants therefore saw both what PES practice in museums and science centres could offer, in the social and educational framings of visits, and positioned these opportunities as exclusive, inaccessible and ultimately, not for them. This was the dilemma at the heart of the visit experiences: participants perceived the potential benefits such opportunities might provide, but were all too aware of the difficulties they faced accessing them.

### **6.5 Ain't misbehaving: The pitfalls and potential of PES participation**

In theoretical terms, this analysis of practice has certain implications. Using the Contextual Model of Learning (Falk & Dierking, 2000) highlighted both how participants could and could not make meaning from the exhibits they encountered. The analysis demonstrates that models of learning can be applied in two ways, or directions, to explore how learning does not happen as well as how it does. One implication of the analysis in this chapter, therefore, is that models of learning, such as the Contextual Model of Learning, can be adapted to take into account issues of inaccessibility, and used as though in reverse, to allow for 'not-learning' to be identified.

The potential value of participation in PES was evident in the analysis of how participants were able to relate to exhibits using personal, interpersonal and/or institutional resources. From this perspective, participants' visit experiences were similar to those suggested by research with other museum and science centre

visitors (Falk & Dierking, 2000). Such visits, therefore, represent the same advantages for participants as they do for other visitors; affective and cognitive learning opportunities, as well as social opportunities. These benefits were also reflected in how participants framed their visits as social and educational occasions. Thus, for participants, PES activities in educational, social and cultural contexts did represent opportunities to develop cultural capital. However, this was not always the case.

In every group, and in some groups more than others, participants could not use personal, interpersonal or institutional resources to relate to exhibits or learn from them. Participants also relied heavily on their own knowledge and backgrounds to make sense of their visits. In combination with the analysis of inaccessibility, their reliance on their own resources suggests that interpretive materials available in science centres and museums did not support meaning making for people from minority ethnic backgrounds, and that as a result participants were left to rely on their own meaning making skills. While using personal resources can be beneficial, for example in developing cross-cultural learning opportunities, it is limiting, not least in terms of access to *new* information and *new* cultural capital.

The analysis presented here also suggests the Contextual Model of Learning does not provide enough of a framework for understanding how participants developed cross-cultural, hybrid and multiple interpretations of exhibits. Although such occasions can be understood under the broad banner of constructivist learning theories, this analysis used the analyses presented in Chapters 4 and 5, alongside theoretical concepts of cross-cultural science education and hybrid learning from Aikenhead (2002) and Roth (2008; 2007), to suggest a more detailed way to understand such occasions. By drawing on previous transnational experiences, for example relating exhibits to activities in their 'home' countries, participants were able to draw on their personal and community-based cultural capital in ways that made exhibits relevant to their lives, and created meaning making opportunities.

These opportunities produced multiple interpretations of the same exhibit, albeit interpretations that were not always supported by institutional interpretive

materials. This range of interpretations suggests that PES opportunities may represent not only some of the same benefits as has been found for existing visitors (such as the development of educational, social and other forms of cultural capital) but specific opportunities for hybrid and cross-cultural meaning making. These opportunities are important because participants who prioritised participation in community-based cultural activities may be able to use PES institutions to support their existing cultural practices. It also suggests a potentially fruitful avenue for those involved in PES policy and practice to develop more inclusive, more relevant opportunities for a wider population. Inclusive PES practices based on polysemic and hybrid learning opportunities, drawing on PES content, practices and ideas as well as people's transnational backgrounds and community-based cultural capital could create powerful opportunities for marginalised groups to develop cultural capital in the fields of PES and science.

That is not to say, however, that PES practices are at present inclusive. Hybrid and polysemic learning opportunities in PES institutions arose where participants relied on their personal and interpersonal resources because they were unable to access institutional interpretive resources. As the Sierra Leonean participants' reflections about getting "carried away" suggest, participants were not always comfortable creating their own interpretations. Feeling uncomfortable and being unsure of how to behave may undermine the benefits of hybrid learning opportunities, leaving participants to conclude their behaviours were inappropriate, that they were 'mis' behaving.

Furthermore, combining the analysis of the visits, visit feedback and the previous chapters suggests that while PES practices may not be sufficiently inclusive, larger structural limitations contribute to non-participation in PES in ways that improving PES practice may make little difference to. For example, Maria from the Latin American group described the difficulty of managing the potential benefits of PES participation with the structural limits of living in poverty and the expense involved in participation:



I feel guilty that I'm not doing it all the time [...] we'd have to make a real effort to get the outings going, [...] but nothing can beat an outing, but you do want to have the cash in your pocket, it's bad enough the little ones saying 'I need this', and everyone else on the street listening, you need to have enough cash in your pocket.

Maria suggests “a real effort” would be needed to participate in PES, and seems to take the responsibility for not participating, suggesting she feels guilty about non-participation on behalf of her family. However, she also cites poverty and expense as the reason participation is so difficult. In this sense, she is highlighting a structural limit to participation in PES, one that she can do little about, although she acknowledges that “nothing can beat an outing”. Thus Maria faced a difficult situation; her non-participation in PES is not contingent upon museum interpretation styles or staff treatment, but structured limitations related to her social position as a new migrant, with few job opportunities, living in poverty.

The example described by Maria in the extract above highlights how non-participation in PES and PES practice are affected by broader social issues. While the three elements of the Contextual Model of Learning, personal, sociocultural and physical context, were narrowly defined in this chapter as personal, interpersonal and institutional resources used to make meaning during the visits, these were explored in greater detail previously in this thesis. The analysis presented in Chapters 4 and 5 suggested that structural limits to participation in PES and participants' habitus affected their non-participation in PES. Combining the Contextual Model of Learning with the broader sociological approach based on the theories of Bourdieu (1984, 1990a; Bourdieu & Passeron, 1990) and intersectional research (such as Holland *et al.*, 2001; Yosso, 2005) provides a far broader theoretical perspective on non-participation in PES than currently available elsewhere in the literature. For example, while Falk and Dierking discuss the contexts involved in their model in theoretically broad terms, these perspectives are framed more narrowly in their research (2000; Falk & Storksdieck, 2005). Thus combining the theoretical insights of research on habitus, capital, field, social position and identity with the more specific

perspective of theories of learning in informal contexts provides a way to understand more about both non-participation in PES and about how learning through such opportunities might happen.

Although visits were enjoyed by participants, these data suggest that considerable change is needed if science centres and museums are to play a part in participants' lives. PES institutions need to support alternative 'readings' of exhibits and consider what interpretive resources are and are not appropriate for the UK's diverse population. If not, there is a risk of alienating people, and rendering PES institutions irrelevant and/or places which disempower some groups as effectively as they empower others. However, examining the ways in which participants framed their visit experiences suggests changes to practice may have only a limited effect on participation in PES.

While participants did describe visits in terms of social and educational experiences, these perceptions cannot necessarily be attributed to the visit experiences since they were described prior to the visits. Furthermore, a 'not for us' disposition or habitus also pre-dated the accompanied visits, and may have been reinforced by the inaccessible and exclusive elements of practice. As discussed in Chapter 4, the structural causes of non-participation, such as marginalised socio-economic status, time and money, continued to limit participation, and were raised as issues regarding the unlikely nature of future participation in PES. Therefore, despite the potential benefits incurred by participation in PES, participants still saw their future involvement in PES as unlikely. While this is not surprising, since it would be unusual for a visit to shift dispositions which had developed over time and no attempt has been made here to change the social contexts of participants' lives, these implications raise questions about whether and how equal and accessible participation in PES might be possible.

## **6.6 Summary**

This chapter examined four visits carried out with community group members to explore the research question: how do people from socio-economically

disadvantaged, minority ethnic groups experience PES in practice? The analysis suggested that learning opportunities within museums and science centres were not always accessible to participants. This analysis has shown that socially exclusive processes were embedded in museum and science centre practices that prevented participants from accessing not only exhibit content but institutions as a whole. Such practices affected participants in every group, to a greater or lesser extent, irrespective of the other benefits they perceived as part of their visit. Furthermore, as might be expected, visits made little difference to how participants related to PES; participation in PES remained unappealing and of little relevance.

In theoretical terms this chapter suggested that adapting models of learning, such as the Contextual Model of Learning (Falk & Dierking, 2000), in order to take 'not-learning' into account was important for understanding how PES practice can contribute to exclusion and non-participation. Theoretical developments for understanding PES experiences as opportunities for hybrid, cross-cultural learning were outlined. Finally, the analysis using the Contextual Model of Learning was related to the analysis based on the theories of Bourdieu and intersectional theorists to suggest a broader model of non-participation in PES is possible, one based on social issues, structural limitations, habitus and practice. In what follows, Chapter 7 discusses the findings and contributions of the research presented in this thesis, while Chapter 8 suggests the limitations and implications of this research and raises possible directions for future research.

## Chapter 7: Discussion of findings and contributions to knowledge

### 7.1 Introduction

This chapter pulls together the findings from the three analytic chapters and the literature review for this thesis to discuss the key findings and contributions of this study of non-participation in PES. The study contributes to an under-researched subject area (non-participation in PES) and was carried out with under-researched groups in this context (socio-economically disadvantaged, minority ethnic groups). As discussed in Chapter 2, while a great deal is known about people who do participate in PES and what benefits they derive from PES opportunities, there is a paucity of empirical or theoretical research on why some people do not participate. Some research on this subject has been conducted in the North American context (Ash, 2004; Ash & Lombana, 2011; Fenichel & Schweingruber, 2010; National Research Council, 2009; Rahm & Ash, 2008). However, this research has focused on what happens in specific PES environments, such as museum or science centre visits, or specific after-school science programmes, rather than exploring people's attitudes and experiences more broadly.

Research on non-participation in PES in the UK is less forthcoming. In the UK, information about non-participation in PES can only be gleaned from quantitative surveys about participation, such as the Ipsos Mori (Ipsos MORI, 2011) *Public attitudes to Science* surveys carried out on behalf of government, or visitor figures from the science centre or museums sectors (see for example Department for Culture Media and Sport, 2010; The Association for Science and Discovery Centres, 2010; Wellcome Trust, 2008). Again, the emphasis in such research is on those who do participate, rather than those who do not. Furthermore, as discussed in Chapter 2, the concept of 'inclusive' PES has not been fully developed in practice or policy, and patterns of non-participation in PES persist. The new contribution to knowledge this thesis makes is to establish a more detailed understanding of why and how non-participation in PES occurs based on empirical data.

The findings of this study suggest two new perspectives on PES: firstly a theoretical understanding of non-participation in PES, and secondly, theoretical insights about inclusive learning in PES contexts. Furthermore this study contributes new methodological perspectives for research on PES and research with disadvantaged communities. The following sections review the findings and contributions of this study in more detail.

## **7.2 Discussion of findings**

This study provides a novel focus to research on PES by exploring the perspectives of those who do not participate in PES activities. This study involved an in-depth exploration of non-participation in PES from the perspectives of 60 participants in 2010, who lived in socio-economically disadvantaged neighbourhoods in Southwark in Central London, and came from four different minority ethnic groups; a Sierra Leonean group, a Somali group, an Asian group and a Latin American group. The findings of this study provide empirical data that suggest a new way of understanding of how social contexts and social positions limit participation in PES and how participants become disposed towards non-participation in PES. Through a series of accompanied visits, this study also found certain elements of PES practice were inaccessible for participants, however, some potential for more positive PES experiences was also uncovered.

### **7.2.1 Social context and non-participation in PES**

The first research question this study explored focused on how social contexts influence non-participation in PES for people from socio-economically disadvantaged, minority ethnic groups. The literature review in Chapter 2 suggested that despite the important role played by science in contemporary British society, little is known about why some people do not participate in PES activities. Existing research drawn from the fields of museum studies, cultural studies and science education suggests that social positions such as age, gender, socio-economic position and ethnicity affect how people engage with science. Patterns of visitor numbers to science centres and museums highlight these same issues, but with little detail about how or why such factors are important

(Department for Culture Media and Sport, 2011b; Ipsos MORI, 2011; The Association for Science and Discovery Centres, 2010). The findings of this study demonstrate the ways in which social positions influence non-participation in PES. Social contexts were found to affect non-participation in PES for people from socio-economically disadvantaged, minority ethnic groups through participants' social positions in two key ways; structural limitations and personal dispositions, or *habitus*.

Issues of migration, ethnicity, socio-economic position, gender and age were found to affect non-participation in PES. The role of these factors was related to the social positions participants occupied and thus to their identities. Participants, having moved to London as linguistic and ethnic minorities, inhabited social positions that were disadvantaged as a result of their migration. These disadvantages resulted from limited employment opportunities, language skills, a lack of information and insecure legal status. That migrants experience such trajectories in terms of social position as a result of their migration has been found in other studies (Vertovec, 2004). This study found that the effects of migration on social position affected participation in PES in particular ways. This study found that in order to participate in PES, sufficient money, time, energy, good health, confidence, English language skills and relevant information were necessary preconditions. Applying this finding in reverse demonstrates how PES, as a cultural field, was structured in ways that make it inaccessible to those without the resources required to take part.

Structured limitations resulting from social positions were not, however, the only contributing factors to non-participation in PES. The importance of other factors was evidenced by the comparison in Chapter 4, between participation in community-based cultural activities and PES. Existing research has pointed towards the high value of community-based cultural activities to migrant communities and their extensive participation in such activities (Trienekens, 2002). This study found a similar pattern amongst participants, who were heavily involved in community-based cultural activities, in stark comparison to their limited or non-existent involvement with PES.

The comparison of these two cultural fields, PES and community-based cultural activities found the role of habitus, or a person's disposition, to be a key factor in determining whether they would get involved in a given cultural field. This study found participants were disposed towards taking part in community-based cultural activities and disposed against taking part in PES. Participants did not see PES as relevant to them and their communities, or as part of their lives. In contrast, community-based cultural activities were seen as highly relevant and important to participants in ways that related to their social positions, such that their involvement in those activities was valued as a key practice for maintaining and negotiating their transnational identities and maintaining links to their cultural heritage.

The comparison between fields also highlighted structural differences. This study found the field of community-based cultural activities was structured in ways that embraced and drew on the participants' existing forms of capital, such as 'home' language and cultural skills. Thus, community-based cultural activities transformed issues that were limiting in terms of PES participation, into positive, useful attributes. For example, to Latin American participants involved with local community-based programmes, speaking Spanish was an advantage; being unable to speak English was irrelevant. However, the reverse was true in terms of engaging with PES.

This study found that non-participation in PES was influenced by a complex mix of issues related to social context, and that social positions played a significant role in both access to different forms of cultural participation and how participation was perceived. The data suggest that for participants, relationships between fields, capitals and habitus were complicated in at least two ways. Firstly, access to the field of PES was found to be limited by participants' social positions since the necessary preconditions for their participation, such as sufficient free time, money or information, were restricted or absent. Thus the field of PES was structurally limited for participants. Secondly, the comparison between the field of PES and the field of community-based cultural activities

suggests that the structural features of a given field affected participants' dispositions towards that field. For example, community-based cultural activities were easier for participants to access and perceived as highly relevant in terms of their social positions. In comparison PES was difficult to access and not perceived as relevant to participants' lives. Thus, there was a mutually reinforcing cycle between the structured limits that made PES inaccessible for participants, and their own habitus, through which they in turn positioned PES as something that had little or no role in their lives.

These findings build on the work of Bourdieu whose research suggested that participation in cultural practices considered important or of high value in society contributed to maintaining and reproducing differences between social groups. He suggested that the way cultural fields were structured affected how participation in those fields was perceived (Bourdieu, 1984; Bourdieu & Passeron, 1990). The findings of Chapter 4 suggest that non-participation in PES was similarly affected by structural issues and habitus, and can be understood as part of a cycle that reproduces social disadvantages. Participants' social positions and the structure of the field of PES limited their access to PES opportunities, and from their perspective participants saw PES as broadly irrelevant. Through their non-participation in PES participants were unable to access resources which could have helped them accrue forms of capital which may have reduced the disadvantages they faced. As a result of the relationships between structural features of the field of PES, participants' social positions and their disposition against participation in PES, non-participation can be understood to contribute to the reproduction of social inequalities.

### **7.2.2 Personal views on and experiences of non-participation in PES**

The second research question explored the views and experiences people from socio-economically disadvantaged, minority ethnic groups had of science and PES. It has been suggested that previous experiences of science and science engagement practices are key sites for the development of attitudes towards science (Osborne *et al.*, 2003). The findings of Chapter 5 demonstrate that participants had limited experience of engagement with science and little or no



direct experience of PES in political or educational, cultural and social contexts, which suggests their non-participation was not based simply on their experiences of PES. As a result, participants drew on their experiences of school science and imagined museum visits to describe their attitudes towards PES. Museums emerged as the most recognised form of PES activity, despite participants having little personal experience of museums. The findings of Chapter 5 suggest participants were disconnected from science and PES in multiple ways and were not disposed to participate in PES. Thus, non-participation in PES can be understood as part of their habitus.

This study found attitudes towards science emerged from participants' school experiences, as well as from their experiences of science in daily life. School was found to be a formative experience for participants, producing long lasting attitudes towards both science and PES. Such associations were often negative, such that participants described school as a context that put them off science as a subject, science education and scientific employment. This finding is in line with existing research that has found science education is frequently seen as difficult and unappealing (L. Archer *et al.*, 2010; Osborne *et al.*, 2003), and particularly off-putting for students from some minority ethnic backgrounds (Elias *et al.*, 2006; Springate *et al.*, 2008) and disadvantaged socio-economic backgrounds (Calabrese Barton, 1998). While an alternative framing of science as a part of everyday, normal life was described by participants, even in daily life science was seen as overwhelming, distant, difficult to understand or study and of limited relevance.

Engagement with science was associated with childhood and children by participants. This framing included science as a subject for school students and the idea that PES, and in particular visits to museums, were seen as something for children or students. As a result, the association of science and PES with youth highlighted another way in which participants, as adults, disassociated from PES. Despite the strong links perceived between youth, science and PES, participants did not perceive PES as a positive part of childhood. One participant even referred to school trips to science museums as "punishments". Contrary to

suggestions that school visits to museums encourage students from minority ethnic backgrounds and socio-economically disadvantaged backgrounds to visit such institutions (Hooper-Greenhill *et al.*, 2009), and to learn science (Rennie, 2007), this study suggests this is not necessarily the case and that school trips to PES environments may be negative experiences for some students.

Experiences of PES in political contexts were very limited amongst participants and little was known about the political aspects of PES practice. For example, very few participants were aware of local or national government consultations on socio-scientific issues. Participants were disinterested in the political aspects of PES. Research suggests that public participation in PES in political contexts is sparked by specific issues such as land use or environmental damage (Marres, 2005). Furthermore, Hornig Priest (2009) has suggested that members of the public rarely wish to participate in political PES exercises and cautions against idealised expectations of public willingness to participate. Thus, disinterest in PES in political contexts may not be restricted to the participants in this study. However, this study found participants were not only disinterested, but felt disempowered with regards to political PES activities. Participants described feeling disempowered by both the scale of socio-scientific issues, such as climate change, as well as previous experiences of political marginalisation. Participants felt that as socio-economically disadvantaged, minority ethnic people they were not in a position to influence political PES exercises.

This study found participants were aware of PES institutions like museums and science centres, in contrast to their almost total lack of knowledge about PES exercises in political contexts. Nonetheless participants knew relatively little about PES activities in educational, social or cultural contexts and had little personal experience of such activities. Despite their limited experience of PES, participants perceived PES experiences in educational, social and cultural contexts to be child-oriented, Eurocentric and classed in ways that were off-putting. Furthermore, participants perceived PES activities in museums and similar institutions to be irrelevant to their lives and could not relate to such activities.

Through participants' accounts of their attitudes towards and experiences of science and PES, this study found a pattern of disidentification with science and PES. Thus, these findings relate to research on the disassociation of school students towards science; students rejected science identities as “not for me” on the grounds that science was masculine, required intelligence and was not for working class students (L. Archer *et al.*, 2010, p. 636). Similarly the work of Bourdieu suggests that certain cultural practices such as visiting art galleries or pursuing higher education were seen as inappropriate and irrelevant to the lives of people from working class backgrounds, and thus “not for the likes of us” (Bourdieu & Passeron, 1990, p. 157). The findings of Chapter 4 and 5 together suggest the pattern of disidentification from science and PES described by participants can be seen as a set of dispositions, influenced by many different experiences that guided their relationship with PES. These dispositions, or habitus, framed how participants perceived their non-participation; as something normal. The findings of Chapter 5 suggest participants' habitus included a long-term disassociation from science and PES, resulting in their non-participation in PES. That habitus and experience are closely related does, however, suggest change may be possible if future experiences prove more relevant, interesting and accessible for participants.

### **7.2.3 PES in practice**

The final research question of this study focused on how people from socio-economically disadvantaged, minority ethnic groups might experience PES in practice. The literature suggests that participation in PES may confer such benefits as learning about science, including cognitive and affective outcomes, enjoyment and potentially, political voice in some situations (Benneworth, 2009; Stocklmayer *et al.*, 2010). Following the work of Bourdieu (1984; Bourdieu & Passeron, 1990), these benefits can be considered as forms of cultural capital, of value in the UK. Particular emphasis in research on PES in educational, cultural and social contexts has been given to the potential for learning through experiences in science centres, botanic gardens, museums and similar environments. Researchers have suggested visitors to such places do learn from

these experiences (Ellenbogen, 2002; Roschelle, 1995), and that such institutions boost the scientific literacy of whole cities (Falk & Needham, 2011). In contrast to that research, this study found PES practice to include both positive and negative elements for participants.

Using Falk and Dierking's (2000) Contextual Model of Learning to analyse the visit data, the findings presented in Chapter 6 suggest that PES experiences in practice included enjoyable and learning experiences, backing up considerable research on learning in informal contexts (Falk & Dierking, 1992; Hein, 1998; Hooper-Greenhill, 1992). Ash and Lombana (2011) have, however, cautioned against applying research from museum visiting populations to make assumptions about the experiences of people from groups who do not typically participate in PES. The findings of this research show that elements of research about learning through PES opportunities do relate to the experiences of people who do not usually participate in PES. Participants in this study were found to use personal, social and institutional resources to make meaning from the exhibits they encountered during the accompanied visits, demonstrating that the Contextual Model of Learning (Falk & Dierking, 2000) was relevant for these PES experiences.

This study also found that the PES experiences involved in this project were sometimes neither enjoyable, nor learning opportunities. Aspects of PES practice were found to be inaccessible for participants as a result of language barriers, design issues and staff facilitation styles. This finding resonates with a smaller, emerging area of research on the learning experiences of people from minority ethnic groups in PES contexts. Research carried out in the US by Ash and her colleagues (Ash, 2004; Ash & Lombana, 2011; Rahm & Ash, 2008) and Garibay (2009) also suggests that mismatches between the language of PES institutions and minority ethnic visitors creates significant problems in terms of their access to information, and thus their ability to learn or feel comfortable in such environments. The findings of this study suggest this is also the case in the UK. For example, Chapter 6 describes how participants felt confused by individual exhibits, exhibitions and whole institutions. Their confusion meant participants

were unable to make sense of aspects of PES in practice and felt uncomfortable as a result. Thus, the findings of this study show that the cultural capital to be garnered through participation in PES activities was not equally accessible, even when participants were directly engaged with PES practices.

This study found that participants felt that PES opportunities were not for them. These findings are contrary to the suggestion from Rahm and Ash (2008), that involvement with PES activities enables people from ethnic and linguistic minorities from socio-economically marginalised backgrounds to identify with science; instead, participants in this study disidentified with science and with PES. This finding echoes previous research on the attitudes of people from minority ethnic groups in London about museums which found museums were seen as irrelevant to the lives of minority ethnic people (Tissier & Singh Nathoo, 2004). Furthermore, the analysis of the visit data and the follow-up interviews found that, for participants, while the potential benefits of PES opportunities were noted, so were broader inaccessibility issues. Participants perceived structured limitations to their involvement in PES, such as time, money, organisational problems, distance and other priorities for their resources. These findings are backed up by the findings related to the previous two research questions; participation in PES was limited by broad, structural factors such as availability of time and money as well as personal attitudes.

Combining the findings of this study related to each research question suggests participants experienced structural limitations to the field of PES, through their previous experiences and direct involvement with PES practices. Participants described their disassociation from science and the field of PES in terms of their social positions, their experiences of and attitudes towards PES and in relation to a tangible PES experience. Thus, this study found that while PES practice consisted of both accessible and inaccessible elements, broader structural constraints were experienced by participants in ways that limited their involvement in PES. These constraints were such that non-participation in PES was structured by the limitations of social position, even before PES practice was experienced. Therefore, this study suggests that while the inaccessible aspects in

the detail of PES practice were problematic, PES can be considered part of a broader pattern of marginalisation that requires social change at a larger scale to take place, so that PES opportunities are equally accessible for all sections of UK society.

### **7.3 Theoretical contributions**

The findings of this study suggest that access to PES and the benefits PES participation may offer are limited for people from socio-economically disadvantaged, minority ethnic backgrounds. As shown in Chapter 4, the necessary preconditions of participation in PES, such as sufficient free time, money and information were not available to participants as a result of their social positions, thus preventing their involvement in the field of PES. Thus, from the perspective of participants, their access to the field of PES was structurally limited in terms of cost, limited available information and the time required to participate, amongst other factors such as location and the perceived irrelevance of such activities to their lives. As shown in Chapters 4 and 5, alongside the structured limits involved in the field of PES, participants developed dispositions that meant they disassociated with science, science education and scientific employment, as well as with PES in political contexts and PES in educational, cultural and social contexts. Thus, participants' habitus created a platform from which they could construct their non-participation in PES; they were not interested in PES, it did not seem relevant to their lives, thus, it was not for them.

The findings of this study suggest participants' perceptions of science and PES, in general and in practice, showed that both the content and practices involved in PES were seen as unappealing to participants, and as 'not for us'. Moreover, the findings presented in Chapter 6 suggest that inaccessibility was built into aspects of PES experiences. Thus, while participants were able to enjoy and learn from PES activities, this was not always the case. Ultimately PES experiences were not seen as part of their lives; after the accompanied visits PES was still described as something they would be unlikely to get involved with again. These findings develop existing perspectives on non-participation in PES and on learning science in informal contexts in two key ways: firstly by establishing a more detailed

understanding of why and how non-participation in PES occurs based on empirical data and secondly by suggesting a more inclusive understanding of learning from PES activities.

### **7.3.1 Developing theories of non-participation in PES**

The main new contribution of this study to knowledge is to establish a more detailed understanding of non-participation in PES based on empirical data. The findings of this study suggest that non-participation in PES was influenced by several factors: the field of PES was structured in ways that made it difficult for participants to access, participants' habitus disposed them against involvement in PES, and PES practice included exclusive and inaccessible elements. This study therefore challenges existing views on PES in two ways. Firstly, by focusing on the experiences and attitudes of non-participants, this study challenges existing research on PES that typically focuses only on those within the system, an important but crucially limited body of knowledge about what participation in PES offers those who do participate. Secondly, the findings of this study contest and develop existing concepts of non-participation, in particular, what has been described as the assimilationist view of inclusion in PES (Fenichel & Schweingruber, 2010; National Research Council, 2009).

As discussed in Chapter 2, contemporary framings of non-participation in PES and other cultural fields have not questioned the inherent value of PES or the nature of PES practices, but have instead focused on the nature of those who do not participate and on the idea of 'barriers' to participation. As a result the assimilationist view has only been able to provide a partial and limited way to understand non-participation in PES. Focusing on those who do not participate risks positioning such groups as behaviourally distinct and problematic (Levitas, 1998). For the field of PES, this has resulted in the practice of targeting specific 'problem' groups (British Science Association, 2006; Stackhouse, Anderson, Shaw, & Iredale, 2010). In the theoretical terms used in this study, focusing on 'problematic' groups can be seen as positioning habitus as the key driver of non-participation.

The focus on ‘barriers’ to participation is similarly limited. While some people are evidently unable to participate in PES as a result of financial or geographic barriers, these are not the only or even most important factors. As this study has shown, while the necessary preconditions for participation in PES were missing for research participants, the absence of ‘free’ time and money did not limit their participation in community-based cultural activities in the same way. Therefore, while the findings of this study suggest ‘barriers’ or structural limits to participation are important, this study suggests a broader and more complex understanding of such issues. For example, while the cost of entry to a zoo may be considered a ‘barrier’, the participatory problems associated with socio-economically disadvantaged social positions suggest the whole field of PES is structurally limited.

A third element to the assimilationist view of inclusion in PES concerns the positioning of science and PES practices as an important part of British culture. As a result, these forms of cultural participation have been valued over others, such as community-based cultural activities, leading to the idea that those who do not participate in PES are lacking in knowledge about science (Science for All Expert Group, 2010). In theoretical terms, therefore, participation in PES can be considered a question of field and power. In the UK, the fields of science and PES have been privileged over the field of community-based cultural activities, and the forms of capital accrued within those fields, valued or not valued accordingly.

This study, in line with research by Trienekens (2002), Yosso (2005) and Ogbu (1992) has shown that participants were far from deficient in terms of participation and culture; they were heavily involved in community-based cultural activities. This study found significant structural differences between the fields of community-based cultural activities and PES, and found that dispositions towards community activities differed from dispositions towards PES. A comparison of these two fields demonstrated that key issues determining participation were ease of accessibility and the perceived relevance of that field.



The issue of relevance was found to be particularly salient for participants. PES was understood as irrelevant, while community-based cultural activities were seen as highly relevant to participants. These findings have implications for PES practice that will be discussed in Chapter 8, but are theoretically important because they suggest that the field of PES and PES practices are themselves problematic, and deserve further attention in order to become more equitable.

The findings of this study therefore suggest that to understand non-participation in PES it is necessary to go beyond looking only at the behaviours and choices of specific groups who do not participate, or certain ‘barriers’. Firstly, the data from this study show that both participants’ attitudes and dispositions, or *habitus*, and the way the field of PES is structured contribute to non-participation in PES. Secondly, the exploration of PES practice carried out in this study suggests that exclusive and inaccessible processes were embedded within PES practices such that participants were at times unable to access the science learning opportunities directly in front of them. These findings suggest therefore that alongside an appreciation of the attitudes, expectations and *habitus* of non-participants and an understanding of the structural limitations of PES as a field, it is also important to accept that PES practices are not unproblematic, but can include exclusive processes that render aspects of PES opportunities inaccessible. Thus, the existing perspectives on participation in PES from research and the perspectives of non-participation in PES drawn on in practice are insufficient since they underestimate the relationships between the structure of PES as a field and non-participants’ dispositions against participation, and do not critically examine PES practices.

Questions remain, however, about the relationships between structured limitations to PES as a field, problematic elements of PES practice and participants’ dispositions against PES. For example, the structure of the field of PES demonstrably limits the extent to which participants could “develop and exercise their capacities and realize their choices” (Young, 1990a, p. 173). As a result, although the findings of this study suggest that structured limitations, PES practice and participants’ dispositions are intertwined, the findings also suggest

structured limitations may constitute the most significant factor. As discussed in Chapters 4, 5 and 6, participants' dispositions against participation in PES were developed with little or no direct PES experience to draw upon. Furthermore, it is reasonable to expect improvements in PES practice to make little difference to those who are still unable to participate as a result of the relationships between their disadvantaged social positions and the way the field of PES is structured. The findings of this study suggest, therefore, that the structural aspect of participation and non-participation in PES must be appreciated in order to alter the uneven playing field of PES participation.

The issue of structured limitations brings this discussion back to a further theoretical issue key to this debate: is the phenomenon in question non-participation or exclusion? This study found that non-participation resulted from both the ways in which PES is structured and practiced, and how people react to, and develop ways to negotiate those structural limits. However, the mutually reinforcing roles of structured inaccessibility within PES and participants' disassociation from PES via their habitus must be carefully considered. This study found non-participation from PES to be structured in ways non-participants could do little about. With little or no capacity to make choices about taking part in PES opportunities, participants can be considered excluded from PES. However, focusing only on structured exclusion removes agency from individuals, and, as this study has shown, participants perceived themselves as making active choices about not taking part in PES opportunities. The findings of this study therefore suggest non-participation is a complex issue. Rather than proposing a simple theoretical or practical solution, this study suggests instead that recognising the complexity of non-participation, however it is termed, is a key part of moving discussions about participation in PES forward.

### **7.3.2 Developing theories of learning for all in informal contexts**

A further theoretical contribution of this study is a more inclusive understanding of learning science in informal contexts. This study contributes to debates about learning through PES opportunities by developing existing models of learning in informal contexts in three ways. Firstly, building on the work of Falk and

Dierking (2000), this study developed their Contextual Model of Learning by using it to analyse when meaning making did and did not happen during PES experiences. The concept of inaccessibility was used to augment their model. As a result, using the model as an analytic framework in reverse meant instances where participants could not use personal, social or institutional contexts to learn during their PES visits could be identified. Exploring these aspects of the accompanied visits highlighted how certain exhibits and interactions failed to provide learning opportunities for participants. This finding suggests that existing models used to understand learning in informal contexts such as museums, science centres and other PES environments can be usefully adapted to understand how learning both does and does *not* happen.

Being able to explore inaccessibility and ‘not-learning’ is important since much of the research on learning carried out in informal science contexts has focused on educational outcomes as a key way in which PES institutions have sought to understand their value, impact and role within society (Allen, 2002; Hein, 1998; Hooper-Greenhill, 1992). A research agenda focused exclusively on how and where learning does happen risks overlooking and obscuring how learning may be limited, difficult or inaccessible for some people. Thus, this study has sought to broaden the theoretical framing of learning in PES contexts, to include an understanding of how learning may not happen, in order to better understand what PES experiences offer to people from socio-economically disadvantaged, minority ethnic backgrounds.

The findings of the analysis presented in Chapter 6 also suggest that the Contextual Model of Learning (Falk & Dierking, 2000) does not provide sufficient detail to understand how participants drew on their transnational identities to create cross-cultural, hybrid and multiple interpretations of exhibits. While these instances of hybrid meaning making can be understood under the broad banner of constructivist theories of learning, such as those described by Falk and Dierking (1992, 2000), Hein (1998) and Driver (1989), existing models of learning in informal contexts, such as the Contextual Model of Learning, do not grasp the complexity of these experiences. This is important because without

sufficient theoretical understanding, it is difficult to develop research designs that can capture the complexities involved or to create better, more inclusive PES practices.

As a result, this study suggested a second way of developing how inclusive science learning in PES contexts are understood. The findings of this study suggested again and again that cultural relevance was an important factor in how participants perceived different opportunities for cultural participation. While science was seen as largely irrelevant, participants saw opportunities that related to their cultural backgrounds as highly relevant to their lives, and suggested they were more likely to participate in such opportunities. This study drew on the work of Roth and his colleagues (2008; Roth & Tobin, 2007) and the work of Aikenhead (2002) to develop theoretical understanding of how multiple, cross-cultural interpretations could be developed in PES contexts, by participants drawing on their transnational identities in such a way that new meanings could be made from existing exhibits.

Combining the analysis of participation in community-based cultural activities from Chapter 4 with the analysis of participants attitudes towards PES in Chapter 5 and the analysis of meaning making processes in Chapter 6 enabled this study to highlight a key way in which PES was relevant and interesting for participants; when it enabled them to draw on their own transnational backgrounds and cultural heritage. As a result, the findings of this study suggest that the hybrid, cross-cultural and polysemic kinds of PES experiences suggested by Aikenhead (2002) and Hooper-Greenhill (1995) may serve as a valuable way to create inclusive exhibits that seem as relevant to participants as the community-based cultural activities they value so highly.

The final theoretical contribution of this study to research on learning science in informal contexts is the combination of the work of Bourdieu and intersectional theories of social position and identity with theories of learning. While constructivist theories of learning have long drawn on the idea that learners bring their identities, social contexts, ideas, attitudes and prior experiences with them

when learning, these issues are not always fully explored in research. For example, there is a mismatch between the theoretical framework used by Falk and Dierking (2000), which draws broadly on constructivist learning perspectives and the way these theories are operationalised for empirical work, as narrowly defined, measurable constructs (see for example Falk & Dierking, 2000; Falk & Storksdieck, 2005). For Falk and Storksdieck (2005) the personal and socio-cultural contexts visitors brought to the museum became a pre-exhibition test of existing content knowledge.

While it is understandably difficult to research visitors' backgrounds in detail in the limited context of a museum visit, this study has shown that a different approach can provide a better understanding of non-participation in PES and inclusive science learning. The findings of this study suggest that a longer term, ethnographic approach to exploring non-participation in PES, in combination with sociological theories about participation, identity and learning can provide useful information that enables the broader issues involved in non-participation to be joined up with a detailed examination of PES in practice and learning science in informal contexts. As a result the kinds of backgrounds participants bring with them to PES opportunities can be better understood in relation to the learning experiences they are exposed to through PES.

#### **7.4 Methodological contributions**

The methodological contributions of this study are two-fold. The first concerns the methodological implications of the theoretical contributions of this study to research on participation and non-participation in PES. The second contribution relates to the details of carrying out research with marginalised communities.

The findings and theoretical contributions of this study suggest that taking a broader approach to research about participation in PES is useful in terms of understanding how people relate to PES and what roles PES plays in society. Research within the branches of sociology and cultural studies concerned with cultural participation have long taken a broad approach to examining how and why people engage with different practices (see for example Bennett *et al.*, 2009;

Bourdieu & Passeron, 1990; Holland *et al.*, 2001). Similarly within sociocultural studies of science education, as well as other areas within education research a longer-term, learning science has been explored using perspectives drawn from theories of identity (see for example Roth & Van Eijck, 2010; Shanahan & Nieswandt, 2011; Wortham, 2008).

However, despite some attempts to frame research in museums, science centres and other PES environments more broadly, such as the theoretical work of Falk and Dierking (2000) regarding museum learning, or the work of Irwin and Michael (2003) on science and society relationships, most research on PES remains narrowly framed. For example, research on PES participation in political as well as educational, cultural and social contexts tends to be carried out with a focus on a specific event or programme, working with people who did participate, and, as a result, represent a self-selected part of the population (see for example Mortensen, 2010; Wilkinson, Bultitude, *et al.*, 2011). Exceptions to this pattern of research are rare and include the more ethnographic work of Ellenbogen (2002) and Macdonald (2002) on learning and museums.

This study has shown that a broader framing of PES is possible through a combination of approaches from sociology, education research and cultural studies, and is useful perspective from which to carry out research. Methodologically this study has looked outside the PES ‘box’, building on the critiques in Chapter 2 of the “conveyor-belt model” of exhibition visitors (Macdonald, 2002, p. 219) or the “classroom-as-container” model of participation and learning (Leander *et al.*, 2010, p. 332). For this study, looking outside the PES ‘box’ meant working with people who were not already participants, working in communities as well as PES environments, working over a longer timescale and using an ethnographic approach alongside interviews, participant observation, focus groups and accompanied visits. This study also took a broad approach to understanding learning in PES environments by exploring occasions where learning did not happen, as well as where it did. Methodologically, therefore PES researchers may wish to consider looking beyond visitors or participants, to those who do not take part, and may consider looking beyond

learning, to ask important questions about where and how learning does not happen.

A second branch of methodological contributions from this study concerns the detail of carrying out research on PES that seeks to explore the influence of overlapping multiple disenfranchised social positions on non-participation in PES. This study worked with community groups of people from minority ethnic backgrounds, living in a socio-economically disadvantaged neighbourhood in central London. It is important to note that while four groups (60 people) participated in the whole of this study, recruitment was difficult. As discussed in Chapter 3, finding willing research participants to take part in a year of data collection for a project about something they are not interested in and do not take part in (PES) was complicated. The reasons people were unable to participate in PES opportunities also prevented their involvement in a research project; many were too busy, too tired or saw the project as of little relevance to their lives.

Recruitment for this study began approximately six months before data collection started, and was on-going for another year. The drop-out rate was high. Over the course of the study I contacted 42 groups, nine of whom participated in different ways at the beginning of the project. However, only four groups took part in the whole study. Grass roots community groups are nebulous, loose arrangements. During the course of the data collection several groups that I had begun working with disbanded. In one case because the main group organiser returned to Pakistan for several months, in another because the organiser became ill and another still because they did not have the money to continue to rent the community space they had been using. In terms of research design, this study shows that working with people and communities for a study of this sort requires flexibility, careful planning, time, relationship building and an understanding of why and how difficult it is for participants to get involved with research and to stay involved.

This study also showed the importance of thinking about participants' needs. Given the emphasis of this research on social justice and the reproduction of

social inequalities, the study was designed to involve participants in the execution and analysis of the study (Crozier, 2003). As a result participants were given opportunities to make decisions about the project, such as choosing their own PES venues for the accompanied visits, and choosing dates and venues for interviews and focus groups. However, as discussed in Chapter 3, a truly participatory approach to research is difficult to carry out (Hammersley & Atkinson, 1997; Reay, 1996).

While I created opportunities for participants to be more involved with the study, these were still top-down choices. In addition, most participants were unable to contribute to the analysis process because they had their own busy lives to attend to. Nonetheless, this study shows the value of building relationships with participants that take their own needs into account. This study would simply have not been possible if it had not been based around participants' lives, their choices about PES venues and their willingness to contribute. Small research reports were developed alongside this project for participating community groups in response to their request for help with funding applications and project evaluations. As a result, this study sought to meet participants' immediate and tangible needs, as well as those of a longer term research agenda. In methodological terms, therefore, this study has shown that working collaboratively with research participants requires careful planning, negotiation and being aware that participants may not have the same agenda as a researcher. This study suggests that taking participants' needs into account can help a researcher build the relationships so vital for carrying out research of this kind.

The final pragmatic methodological point this study has highlighted is the value of being multi-lingual and employing translators. As will be discussed in Chapter 8, this study was limited by the occasional communication difficulties that arose because of the different languages spoken by participants and myself. As discussed in Chapter 3, the issue of "betweenness" in research (Nast, 1994, p. 57), in other words being inevitably different as a researcher from those with whom you carry out research, is something that all researchers must address. However, in this case, employing a community translator during this study may have been



useful for both recruitment purposes and translating data for analysis. Therefore, the final suggestion this study makes to researchers interested in carrying out similar work, would be to consider potential translator costs as part of a research budget when working with linguistically diverse, minority ethnic communities.

### **7.5 Summary**

In summary the findings of this research contribute to the fields of science education, cultural studies, science and technology studies and museum studies by identifying the factors involved in non-participation in PES, from the perspectives of those who do not take part. The findings of this study suggest that structural limits to the field of PES, participants' habitus and aspects of PES practice all contribute to non-participation in PES. This chapter discussed the findings of this study and the significance of these findings in terms of the theoretical and methodological contributions of this study. The novel contribution this study makes to knowledge is a more detailed, empirically based understanding of why and how non-participation in PES takes place, as well as a more developed understanding of the possibilities of inclusive science learning in informal contexts such as PES. The findings of this study suggest that non-participation in PES is a complex issue. Rather than putting forward one theoretical solution, this study suggests instead that recognising the complicated nature of the different and interrelated issues involved in non-participation is crucial for improving how non-participation in PES is understood and addressed.

The findings of this study also suggest new methodological perspectives for research on PES and research with disadvantaged communities. These methodological contributions suggest that research on PES participation can be usefully framed more broadly though the application of theories from other areas of social research. Furthermore, the findings of this study suggest certain pragmatic issues that researchers interested in exploring non-participation in PES and/or working with minority ethnic groups may wish to consider. The following and final chapter discusses the additional implications of this study for PES practice, the limitations of this study and suggestions for future research.

## **Chapter 8: Limitations, implications and directions for future research**

### **8.1 Introduction**

This chapter contextualises the findings and contributions of this study by suggesting its limitations, implications and directions for future research. The methodological and theoretical limitations of this study are outlined first, followed by a discussion of the implications of this study and some possibilities for future research.

The main contribution of this study to knowledge is a more detailed, empirically based understanding of non-participation in PES. The findings of this study suggest non-participation in PES is a complex phenomenon, involving structural limits to how PES as a field could be accessed, exclusive aspects of PES practice, the day-to-day issues faced by people living in disadvantaged social positions, as well as their attitudes, such as a broad disassociation from science and PES.

As mentioned in Chapters 1 and 3, this research was carried out with the hope that it might be able to contribute to how non-participation in PES is understood and, therefore, how it is addressed in practice, research and policy. Thus, the limitations and the implications that the findings of this study suggest for PES practice, research and policy are discussed here. Several directions for future research based on this study, that could develop further the empirical and theoretical findings, are then suggested. This study cannot suggest a list of simple solutions to non-participation in PES or the research project that would provide such a solution, but instead the limitations, implications and ideas for future research that arose during this study are outlined here in the hope that they may be informative for others interested in PES.

### **8.2 The limitations of this study**

This study sought to understand how and why people from socio-economically disadvantaged, minority ethnic backgrounds did not participate in PES. The findings contribute a more detailed, empirically based understanding of non-

participation in PES, as well as a more developed understanding of the possibilities of inclusive science learning in PES contexts such as museums and science centres. However, this study also involved particular methodological and theoretical limitations that ought to be taken into account.

One limitation of the study was in terms of participant recruitment. Drawing on research about who does participate in PES in the UK and intersectional research about the relationships between social positions and social disadvantages (P. H. Collins, 2000; Ipsos MORI, 2011) this study sought to recruit participants who inhabited both minority ethnic positions and socio-economically disadvantaged positions. Identifying, recruiting and carrying out research with people who did not participate in PES was difficult. Exploring non-participation in PES with people who, in order to be involved had to be unfamiliar with PES activities, was not always straightforward. Unsurprisingly, participants sometimes found it hard to talk about a field they were not involved with. Furthermore, the field of PES is confusing even to those practitioners, policy makers and researchers who might be considered ‘insiders’ (Science for All Expert Group, 2010; Trench, 2008). Thus, there were limitations involved in discussing PES with participants, which is why the accompanied visits to PES activities were so valuable.

Once community groups were identified, negotiating access was difficult and, as discussed in Chapters 3 and 7, although 42 groups were contacted, ultimately only four participated in the study. The findings must therefore be considered in relation to the four groups of participants. Given the qualitative and ethnographic nature of the research, limitations to the generalisability of the findings must be noted as follows. Firstly, the findings of this study are specific to the research participants and the contexts of their lives at the time of data collection, 2010. That is to say, these findings cannot be applied to, for instance, all Somalis living in Southwark, London or the UK. Secondly, these findings cannot be applied to everyone from an ethnic minority background in London, the UK, or elsewhere, since the specific histories of migrant groups vary considerably by, as Vertovec (2004, 2007) and Rouse (1992) have suggested, their migration trajectories, the

amount of time spent in a specific country, the social networks that support their migration and their other social positions, such as their socio-economic positions.

This research was, however, as discussed in Chapter 3, designed as an exploratory study of non-participation in PES. For an exploratory study, following an ethnographic approach, working with four groups from different minority ethnic backgrounds with members of different ages, genders and length of time spent in the UK, was a useful way to investigate breadth as well as depth in terms of non-participation in PES. Furthermore, the key findings of this study emerged from data collected with every group, which suggests that these findings suggest patterns that may be applicable beyond the individuals involved.

This study was also limited by the participatory approaches used. As discussed in Chapter 3, participatory approaches seek to balance the needs of researchers with the needs of research participants, and this study attempted to follow a similar process. Ultimately, however, this study cannot be described as fully participatory. Participants saw their involvement in the study as something they did to help me as the researcher; they did not see the project as mutually beneficial and had not been involved in its design. It was difficult enough for participants to be involved at all, let alone in what they saw as the additional work of making decisions about the project or taking part in the data analysis process. Thus, this study is better understood as being informed by a participatory approach that influenced how aspects of the project were carried out. In this respect, fitting data collection around the community activities participants allowed me access to and involving participants in choices about data collection encouraged the research participants to contribute to the study and meant the data collection for this study was possible.

While taking a participatory approach provided certain advantages for this study, it also resulted in certain limitations, in particular, with the accompanied visit element of the project. Participants were offered a choice of PES activities to experience as part of the project, which was seen, in many cases, as the main reason for their involvement. As a result, the accompanied visits were an

important part of recruiting and retaining research participants. However, since participants chose the PES activities they wanted to visit, this limited certain possibilities for comparability within the study. For example, it may have been useful to have been able to compare the difficulties faced by the Somali participants at the Centre of the Cell with the experiences of another group at the same institution. Equally, the Somali participants may have had a very different experience at the Horniman Museum, or the Natural History Museum, which would have provided interesting points of comparison. However, as outlined above, this study was designed to be exploratory rather than strictly comparative. While ensuring that all groups visited the same institution may have been informative in terms of what that particular institution offered participants, it may not have yielded the same range of findings that the different visits did, from the positive to more negative PES experiences.

Providing the opportunity for participants to choose their own PES activities also limited the extent to which this project could explore their views and experiences towards PES in political contexts. As outlined in Chapter 5, participants were broadly disinterested in political PES activities and all groups chose educational, social and cultural PES contexts for their visits. While this is in itself an interesting finding, the analysis of observed PES experiences in this study ultimately focused on informal science learning contexts. Thus, although this study tried to take a broad view of PES activities, this was not possible in the accompanied visits part of the project, limiting the possible breadth of findings as a result.

The data collection for this study was also limited by pragmatic constraints including language issues and potential positive bias in participants' responses. As suggested in Chapters 3 and 7, while participants were sampled on the basis that we could understand one another while talking, over the course of data collection it became clear that this level of communication was not always sufficient. Furthermore, relying on participants to translate for one another or for me was not always possible. Translation services were not employed for this project due to the expense involved, but as outlined in Chapter 7, my experiences

in this study suggest translation may be useful in future research with participants from linguistic minorities. Language issues ultimately limited aspects of the data collection and the analysis of transcribed focus groups, interviews and visits.

Another limitation was evident in the follow up interviews related to the accompanied visits analysed in Chapter 6. Participants' responses to the accompanied visits were more positive than the analysis of the visits suggested. In this respect it is important to keep in mind that while participants may have valued visits as much as they described, there are problems with self-reported data of this kind. Participants may have wished to seem positive about the visits to me, the person who had organised the visits and paid for them to take part. Participants saw me as an 'insider' to PES. By the time the accompanied visits took place, I had spent a number of months with the groups and had developed friendly relationships with participants, such that they may not have wished to disappoint me by being negative. Thus, interviews associated with the accompanied visits were potentially limited by a positive bias, and, as such, it was important to be able to contextualise those interviews with recordings from the visit and the other data sets generated through the focus groups, other interviews and participant observations.

Finally, there are certain theoretical limitations to this study that relate to participant recruitment and the findings of the project. As discussed throughout this thesis, an intersectional approach to the influence of social positions on social inequalities and access to cultural resources was used to augment the work of Bourdieu to create the theoretical framework that underpinned this study. While intersectional approaches to understanding the relationships between cultural participation and social inequalities are useful, the different roles played by the social positions investigated in this study are, as a result, hard to disentangle. As discussed in Chapter 2, research by Bennett *et al.* (2009) and Bourdieu (1984; Bourdieu *et al.*, 1990) has suggested that class, or socio-economic position, plays a significant role in determining participation in cultural and educational fields. Furthermore, research on patterns of participation in PES in the UK suggests that groups from White, European, working class backgrounds do not visit museums,

science centres, zoos or other informal science learning environments (Department for Culture Media and Sport, 2011b).

Thus, existing research suggests that class or socio-economic position may be an important factor in determining participation in PES. However, this study cannot make specific claims about the relationships between non-participation in PES and social class, or gender, or age, or ethnicity, or any other social position alone, since these were explored here as inter-related issues, rather than in isolation. This research was nonetheless, as argued above, exploratory in nature and sought to investigate non-participation in PES from the perspective of those living in the overlap of different social positions that seemed to affect non-participation. Furthermore, as Skeggs (2004) and Holland *et al.* (2001) have noted in their research on embodied identities, people do occupy multiple social positions simultaneously, such that distinguishing between them is problematic. Thus, while this research may be able to offer little in the way of specific findings regarding class, the findings suggest that a broad focus on multiple social positions provides a better understanding of non-participation in PES than might be afforded by a narrower framing of the question that focused, for example, only on class, gender or ethnicity.

### **8.3 The implications of this study**

The implications of this study concern three main areas: PES practice, research and policy. Each of these areas affects the others and the implications outlined below overlap in certain ways. The implications for PES practice are outlined in the first section, while the implications for research and PES policy are outlined in the second section.

#### **8.3.1 Implications for PES practice**

The findings of this study have several implications for PES practice, these will be outlined here, starting with the most theoretical and ending with practical implications. One key implication of this study is that PES practices could become more accessible and inclusive. If the structure of the field of PES and particular elements of PES practice are understood to contribute to non-

participation in PES by limiting access for certain social groups, the first, and perhaps most simple, but most important, implication of this study is that PES practices are not sufficiently inclusive and could be improved. It is, however, important to understand the scope of PES activities and their wider roles in society, as well as their potential. As discussed throughout this thesis, non-participation in PES can be understood to play a part in the reproduction of social inequalities. Those who do not participate as a result of the relationships between their disadvantaged social positions and the structural limits of PES as a field are less able to access the resources PES activities may offer, and, as a result, may be less able to change their social positions. Access to the political, educational, social and cultural benefits PES participation is understood to offer, may therefore, provide powerful ways to redress social disadvantages.

The potential of PES for disrupting rather than maintaining cycles of non-participation that reproduce social inequalities must, however, be carefully understood. The findings of this study suggest several factors involved in non-participation in PES lie beyond the responsibility and scope of PES policy makers, researchers or practitioners. For example, the findings presented in Chapters 4, 5 and 6, suggest that participants' dispositions against science and PES were deeply ingrained. Perceptions of PES as irrelevant, inaccessible and unimportant were not always based on participants' personal experiences of PES, but based instead on other experiences, such as learning science at school or political marginalisation. There is however, little PES institutions or practitioners are likely to be able to do to combat negative perceptions of school science or widespread political disenfranchisement.

Furthermore, while PES institutions and practitioners may be able to address certain structural issues (as will be discussed below) other limits to participation in PES are outside their remit. For example, PES practitioners may have little opportunity to address the exploitative working conditions experienced by migrants, whose insecure employment arrangements mean that they work several jobs to support themselves and their families, and as a result, have very little 'free' time. It is also important to consider more extreme examples that arose



during this study, such as the issue of immigrants without legal status in the UK, who as a result, were afraid of official institutions because they were worried about being noticed. There is understandably little or nothing PES practitioners can do about the participatory limits faced by people in social positions such as these. Thus, the potential for inclusive PES practices to redress social inequalities can be understood as limited in particular ways.

The findings of this study suggest, however, that the factors which contribute to non-participation in PES are interrelated and influence one-another. These relationships between the various factors involved suggest that while it is important to take a realistic perspective regarding the role of PES, more inclusive PES practices may be able to contribute to improving social equality. As argued in Chapter 5, since participants' dispositions against PES participation were at least partly influenced by the field of PES and PES practices, it is reasonable to suggest that improvements in PES practice might, over time, shift these dispositions towards more favourable views of PES. Thus, addressing some of the structured limits to participation outlined in Chapter 4 and the exclusive elements of PES practice outlined in Chapter 6 may help to develop more inclusive PES practices.

The findings presented in Chapter 4 suggest that PES was inaccessible for participants because of the relationships between their social positions and the structure of the field of PES. Of these structured limitations, there are several that PES institutions and practitioners may be able to address, for example the costs involved with a visit and the availability of information about PES. This approach is similar to the 'barriers' approach discussed in Chapter 2, and the issue of cost is one of the 'barriers' that are currently addressed in some institutions. While it has been suggested that the removal of entrance fees from national museums in the UK made little difference to the diversity of visitors (Ipsos MORI, 2003), some PES institutions have developed more successful cost reduction policies targeted towards specific groups of non-participants.

For example, based on research that suggested minority ethnic families were not visiting as a result of the high costs involved in family visits with six or more people, PES institutions such as Thinktank in Birmingham and the Exploratorium in San Francisco introduced reduced entrance fees for families from certain areas of their cities<sup>11</sup>. As a result, the multi-generational, large family visits preferred by people from some of the minority ethnic communities in Birmingham and San Francisco became more affordable and more members of these communities visited those PES institutions. In a similar vein, the Monterey Bay Aquarium provides free entrance tickets to socio-economically disadvantaged local communities through partnerships with libraries<sup>12</sup>. These projects suggest that cost reduction strategies based on the specific needs of local communities may provide one route to improving access to PES for people from socio-economically disadvantaged, minority ethnic groups.

The findings of this study also suggest that making more information about PES opportunities available to socio-economically disadvantaged, minority ethnic communities may help to address the confusion and widespread unfamiliarity with PES reported by participants. Research by Tedrow (2009) in the US, has suggested that minority ethnic communities use different media channels, often community based, as well as continuing to engage with media from ‘home’ countries. As a result, Tedrow suggests that PES institutions ought to research the information sources and media channels used by groups they wish to attract, and restructure their marketing accordingly. Using different media networks, such as the free Spanish newspapers published by Latin American communities or Asian radio stations, to disseminate information about PES to specific groups could be a valuable tool for opening PES opportunities up for more diverse participants. In addition, going to meet people from different communities by attending their community based celebrations may provide another route to share information about PES.

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<sup>11</sup> From personal correspondence with Veronica Garcia Luis at the Exploratorium and Kenny Webster at Thinktank.

<sup>12</sup> From personal correspondence with Jenny De La Hoz at Monterey Bay Aquarium.

The role of habitus in non-participation suggests that a long term view of working in partnership with non-participants to develop inclusive PES practices may be useful. This study found that participants valued and were motivated to participate in engagement opportunities that related to their transnational cultural backgrounds. Furthermore, the findings reported in Chapter 6 suggest that combining PES with culturally relevant content that participants could connect with provided a way for participants to relate to an exhibit, object or concept that seemed otherwise of little interest to them. Developing inclusive exhibits, events and programmes, designed to support polysemic, hybrid meaning making and associated behaviours could help more participants from diverse backgrounds enjoy and learn from PES experiences. Developing PES opportunities that overlap with community-based cultural activities, for example, may provide a way to make PES relevant for people from socio-economically disadvantaged, minority ethnic communities. By working together, PES practitioners and those who do not currently participate in PES may be able to find common ground from which to develop more inclusive PES practices.

The challenge for PES institutions may be to move beyond the short term, tokenistic approach to working with non-participants that currently pervades approaches to inclusive PES practice (Lynch, 2011). To shift the dispositions of those who do not currently participate in PES, towards rather than against PES, may require considerable effort and funding over a long period of time on the part of PES institutions, practitioners and policy makers. A long term approach is not, however, beyond the scope of public engagement institutions. The South London Gallery, for example, although based on artistic rather than scientific content, has spent the last decade developing relationships with communities on the council estates surrounding the Gallery, based on the principles of shared decision making and driven by community needs (Williams, 2011). One outcome of these collaborative practices has been that the gallery is visited more by members of local communities than it was before. The example of the South London Gallery suggests that changes to how non-participants are perceived, and therefore, approached, can create positive relationships between public engagement institutions and those who might not currently participate.

Working in partnership with people from different social groups may also help PES institutions develop more inclusive, mutually beneficial PES practices. For example, the findings of this study suggest that insufficient support was available for participants to make meaning from certain aspects of their PES experiences. Language skills, exhibit design, staff facilitation styles and way-finding within PES environments were problematic for participants. Providing translation services, through materials or personal support is sometimes regarded as a minefield, especially in multi-lingual, global cities such as London which are considered to be “super diverse” (Sassen, 2001; Vertovec, 2007). However, informal science learning environments in the US have met with success by partnering with local communities and developing linguistically appropriate interpretive materials that support and enhance their learning experiences (Dawson, 2011; Fenichel & Schweingruber, 2010). The experiences of these US institutions suggest that similar practices could be usefully developed in the UK. Training PES practitioners to work with culturally and linguistically diverse visitors and developing alternative facilitation styles to support such visitors, may also be useful. In addition, recruiting staff from diverse backgrounds may help a broader range of participants feel welcome in PES environments.

It is important to note that the suggestions outlined in this section overlap, to some degree, with approaches already being used in PES practice. The findings of this study, however, suggest that non-participation in PES is influenced by several factors acting in concert. Consequently, attempting to address non-participation in PES only by changing practices around language use, or marketing, may not be enough. The key implication for PES practice suggested by the findings of this study is that to change patterns of non-participation in PES, multiple approaches may need to be used at the same time. Thus, structural ‘barriers’, such as cost, could be reduced in tandem with changes in specific elements of PES practice to welcome rather than confuse and ostracise current non-participants, and at the same time, the durable influence of habitus on participants’ behaviours might be recognised and addressed via long-term relationship building strategies. Thus, to become more inclusive, PES practices

may need to change on many fronts in order to make a difference to patterns of non-participation in PES.

### **8.3.2 Implications for research and policy: PES ‘for all’?**

The study’s findings have several implications for research on PES and PES policy, which will be discussed here in turn. In terms of research, the implications of this study suggest that research exploring PES may benefit from being more broadly framed. The combination of sociological theories from the work of Bourdieu (1984, 1990a, 1990b), with more detailed theories about learning science in informal contexts, provides a useful framework with which to research participation in PES from a broad perspective. As discussed in Chapter 2, however, the majority of existing research on PES focuses on those who do participate and what they learn through their experiences in a narrow range of contexts. As a result, the available research has focused largely on the learning experiences of visitors to museums or science centres, with a parallel focus on the design and outcomes of political PES exercises. These two branches are rarely researched in relation to one another, or in terms of what they both offer to participants.

This study suggests that research on PES which explores beyond the terrain of learning science in museums or science centres *and* beyond the outcomes of political consultations, can provide valuable insights into how people understand cultural participation, how people see science, PES, politics and how people learn, amongst other things. These are important research agendas for cultural studies, science and technology studies, museum studies and science education, to which this study contributes. The general implication of this study for research is, therefore, to explore beyond the current, inward-facing, research focus on PES participants and the opportunities they enjoy.

In particular, this study’s findings suggest that learning more about non-participation in PES would be valuable. If, as research suggests, most PES participants are from White European, middle class backgrounds who participate in family or school groups (Ipsos MORI, 2011), there is much to learn about what

PES participation may represent and offer to people from different social groups. As the findings of this study suggest, PES activities are not equally accessible and may not offer everyone positive learning experiences. Thus, carrying out research to develop a better understanding of how to create and deliver inclusive PES activities and inclusive science learning opportunities for those outside core PES audiences is important.

As suggested in Chapter 6, the hybrid, cross-cultural informal science learning experiences of people from socio-economically disadvantaged, minority ethnic groups are under theorised and deserve further development. The data from this study have provided some scope for combining theoretical perspectives from research on museum learning with perspectives from research on multicultural science education (Aikenhead, 2002; Falk & Dierking, 2000; Roth, 2008). This topic, however, deserves more exploration. Learning more about how to make PES practices equitable and culturally appropriate so that they can become accessible and relevant for different kinds of participants is important in two key ways. Firstly, it is important to develop PES practices that are inclusive rather than exclusive in order to disrupt the reproduction of social disadvantages, and secondly, more inclusive practices are vital for the longer-term sustainability of PES institutions, such as museums and science centres. In an increasingly diverse population faced with alternative priorities, not to mention competing forms of cultural participation, PES institutions may need to become more inclusive if they are to survive.

In addition, the implications of this study extend beyond research on inclusive PES practices to suggest that the focus of research on PES could be usefully expanded to include not only different kinds of participants, but also different institutions, different outcomes, different science engagement practices and different timescales. For example, research that examined PES institutions beyond the ‘usual suspects’ of museums and science centres, to develop a better understanding of PES experiences in botanic gardens, science festivals, science cafés or wildlife parks, as well as national and local political PES exercises, could

provide valuable information about the role of PES in the UK and on the differences between such experiences and how they are framed.

Furthermore, this study suggests that researching how people experience and engage with science throughout their lives may provide a more useful knowledge base for understanding how people learn science than research that focuses on small units of time, such as, for example, a museum visit. If the horizons of PES research can be broadened, it might be possible to develop theories that understood engagement with science and science learning across people's lives. Such theories could then better position the role of particular experiences such as learning science at school, visits to a zoo or watching science documentaries, within a broader process of life-long learning.

The findings of this study suggest that non-participation in PES is affected by several factors including the structure of the field of PES, participants' dispositions against science and PES, and by PES experiences themselves. These findings have several implications for PES policy. Firstly, government PES policies have suggested that engagement with science is for everyone. For example, the 2010 *Science for All* report stated that "Our vision is of all sections of society valuing the sciences and their methods" (Science for All Expert Group, p. 6). However, this study has shown that PES opportunities are far from equally accessible and suggests that, as a result, it may be difficult for 'all sections of society' to understand or appreciate the sciences. This study has also shown that not only were participants disposed against science and participation in PES, but that elements of PES practice were exclusive and that the field of PES was structurally inaccessible. As a result, in contrast to the policy rhetoric, this study has shown that science and PES are not 'for all'.

Despite shifts in emphasis over time, policy documents pertaining to relationships between science and publics continue to suggest participation in PES may confer society-wide benefits. These benefits include improved decision making through public participation, increased scientific literacy (defined in various ways) and, as a result, improvements to the economy through a scientifically literate workforce

(see for example House of Lords, 2000; Science and Trust Expert Group, 2010; Science for All Expert Group, 2010; The Royal Society, 1985). However, if only certain publics participate in PES, these claims are at best limited, and at worst simply unsubstantiated. For example, claims made regarding improved, democratic decision making processes cannot be upheld if PES is inaccessible for certain communities.

Furthermore, this study found that participation in PES practices did not confer the advantages that policy documents have suggested. Not all participants learnt from or enjoyed their PES experiences, and gained little from these experiences other than the confirmation that PES was not for them. Thus, policy claims regarding the role of PES in increasing the scientific literacy of the nation ought to be questioned. PES policies require a more realistic view of the role of PES in society, given that at present PES might be described as partial public engagement with science. Thus, another implication of this study for policy is that PES ought to be critically re-examined in light of the broader research perspective outlined above, that explores beyond the advantages conferred by participation on core audiences.

The findings also imply that PES policies ought to be reframed so that their views of publics include a more nuanced understanding of how and why people from certain social groups participate, while people from other social groups do not. This implication involves a recognition on the part of policy makers that the assimilationist view of inclusive PES (National Research Council, 2009), described in Chapter 2, needs to be revised. This study has demonstrated that while participants retained a sense of agency over their rejection of PES, their participation in PES was limited through the relationships between their social positions and the structure of the field, as well as inaccessible aspects of PES practice. This suggests that non-participation does not arise through participatory, cultural or educational deficiencies inherent within certain individuals or groups, but rather that the structure of PES as a field and PES practices are problematic. While restructuring PES involves a number of practical issues, it is important that



the need for change is appreciated at a policy level and funding made available so that a shift towards inclusive PES practice can take place.

#### **8.4 Directions for future research**

This study has contributed to research on PES and learning science in informal contexts by providing a better understanding of why and how non-participation in PES occurs, as well as insights into the potential benefits participation in PES may offer those who do not currently participate. The contributions, limitations and implications of this study point towards potentially valuable directions for future research. Areas of research, the rationale for their investigation and potential research questions are outlined here.

As suggested by the implications for research outlined above, there is scope for developing research programmes that explore PES more broadly in at least four ways. Firstly, by exploring non-participation from the perspectives of people from other social groups that research suggests do not currently participate, such as people from White European, socio-economically disadvantaged backgrounds. Secondly, our understanding of PES could be usefully extended by more research on the potential for inclusive science learning through PES opportunities. Thirdly, a broader programme of research could explore experiences beyond those in museums and science centres and beyond the outcomes of political PES exercises by carrying out research with a broader range of institutions. Finally, research that explored a more holistic view of engagement with science, science learning and people's lives could provide useful information with which to better understand the relationships between different science engagement experiences and how learning happens.

Research that could build a broader empirical picture of why and how certain social groups do not participate would help to balance the limited perspectives currently available in research on PES publics. As the limitations of this study suggested, little is known about why people from White, British, socio-economically marginalised backgrounds do not participate in PES. As the population of the UK becomes ever more diverse, inclusive PES activities may be

required to address the needs of many different groups. Thus, there is a need to continue exploring the views and experiences of people from outside core PES audiences. The research questions used in this study could be redirected to explore such issues. For example, one adapted research question could be; what factors influence non-participation in PES for people from White, British, disadvantaged socio-economic backgrounds? Such questions could be investigated with a research design based on the one used in this study, using an ethnographic approach to explore PES with focus groups, multiple interviews and accompanied visits.

Additional research of this kind would facilitate comparisons between studies which would enable a more detailed exploration of the roles of different social positions in PES participation. Sufficient research on the relationships between different social positions and participation, or non-participation in PES, would provide useful information about how participation is structured, and what roles PES plays in society as a whole. Studies like the one presented in this thesis can make suggestions about what the role of PES may be, but further evidence is needed to understand the political, social and cultural roles of the field of PES more broadly.

A second way in which this study could be usefully extended would be to focus on how informal science environments could better support the learning experiences of people who do not currently participate in PES. The findings of this study suggest that certain environments can offer polysemic, hybrid meaning making experiences to visitors from socio-economically disadvantaged, minority ethnic backgrounds. However, exploring inclusive science learning experiences in PES environments deserves further attention as investigating the subject in depth was beyond the scope of this study. More research is needed to better understand the nature of these experiences and the extent to which people from a range of different backgrounds could be supported to learn about science in ways that relate to their backgrounds and positional identities. In particular, the theoretical basis of inclusive science learning through PES experiences requires further development. Exploring the potential for inclusive science learning in

PES contexts may be suited to a participatory action research approach. For example, working with non-participants, PES practitioners and researchers to develop inclusive PES activities may provide insights into how inclusive learning opportunities can be created. A suggested research question is as follows; how can informal learning environments better support the science learning experiences of participants from diverse backgrounds?

Thirdly, as suggested by one of the limitations of this study, a more detailed exploration of attitudes towards non-participation in political PES activities could provide information that would help contextualise such activities in terms of the broader field of PES. This study was unable to explore observed experiences of political PES exercises, since participants chose not to involve such activities in the accompanied visit which took place as part of the research. However, research on political PES activities is rarely linked to PES experiences in educational, cultural or social contexts, with the work of Davies *et al.* (2009) providing a rare example of research that draws the two branches of PES together. An extension of this study that focuses on exploring the attitudes and experiences of people from socio-economically disadvantaged, minority ethnic groups with regards to PES in political contexts, would provide useful information in this respect. A research question could be adapted from this study as follows; how do people from socio-economically disadvantaged, minority ethnic groups experience political PES activities in practice?

This perspective on future research could be further developed to consider how the different branches of PES and different kinds of PES institutions are perceived and used by different social groups. As suggested by the implications of this study for research, much of the research about PES and PES participation focuses on particular institutions, typically museums and science centres. However, research suggests that PES opportunities are provided by a variety of organisations beyond the kinds of museums and science centres involved in this study (Falk & Dierking, in press; King & Dillon, 2012). PES activities are offered by a far wider range of institutions under political as well as educational, cultural and social remits. Exploring the relationships between different kinds of PES

opportunities and how those opportunities are perceived would provide useful data from which to develop theories about the cultural and social roles of PES. Studies based on exploring PES as a field could be designed in several ways, depending on the perspective taken. For example, the available PES opportunities available in the UK could be mapped. However, it may not matter that many different organisations offer PES opportunities if potential participants do not recognise these as relevant or worthwhile activities. Building on the work of this study and starting from the perspective of a potential participant, rather than the perspective of a PES institution or PES funder, some research questions for a study exploring the field of PES more broadly could be; what PES opportunities are recognised by members of the public? How does the recognition of PES opportunities differ for people from different social groups? Are there differences between the PES opportunities people recognise and the ones they participate in?

A final direction for future research would be to explore in more detail the role of science in the lives of people in Britain in order to better understand the role of science engagement experiences and how learning happens. This topic has only been partially explored in this study and the findings presented in Chapter 5. There have now been four nationwide Ipsos Mori studies on public attitudes towards science (the most recent reports on data collected in 2011), however, while these surveys involve large numbers of participants they are limited in the detail they can provide. Ellenbogen's (2002) ethnographic study into how one family engaged with science over a year is, in contrast, very detailed, but with a far smaller sample and thus less generalisable. Using a mixed methods approach similar to that employed by Bennett *et al.* (2009) in their study of the relationships between socio-economic status and participation in different cultural fields could provide a useful approach for a study of the role of science, PES and science learning in people's lives.

The Bennett *et al.* (2009) study sought to replicate Bourdieu's (1984) investigation into patterns of cultural participation in France, in a contemporary British context and combined focus groups, surveys, interviews and observational research methods. It focused on how people engaged with music, reading, visual

art, media and the body but did not involve any aspects of science, other than reading science fiction. If, as argued in Chapter 2, science is a key part of British culture (Ziman, 2002), exploring how people engage with the cultural field of science, as well as science education and involvement in PES in the long term would provide valuable information about how people in Britain see, understand, learn and relate to science. For example, how do people interact with science and science learning opportunities if they are faced with a plethora of prospects, ranging from those at school, to science centres, to their back gardens, family holidays, television documentaries and books? How do people ‘engage’ with science in this broad sense? The following research questions could provide useful starting points for such a study; in what ways do people living in the UK experience science? What are their views and attitudes towards science? What roles do science engagement experiences play in their lives? How does science learning happen over a life-time?

### **8.5 Afterword**

Overall, this study has sought to explore non-participation in PES from the perspectives of those who do not normally take part in PES activities, and to expand perspectives on participation in PES in research, policy and practice. This study was carried out because of concerns I had about the narrow range of PES participants I encountered while carrying out projects and research in museums, science centres, after-school science clubs, science festivals, university science ‘out-reach’ programmes as well as political consultations for national government and scientific societies.

The findings of this study suggest that PES environments such as those listed above are not accessible for everyone, and are not necessarily accessible even if physical access can be arranged. The main new contribution of this study to knowledge is an empirically based understanding of non-participation in PES from the perspective of those who are normally silent in research on PES; those who do not participate. The findings of this study suggest non-participation in PES is a complex phenomenon that involves exclusive elements within PES practice, the relationships between the structure of PES as a field and the day-to-

day issues faced by people living in disadvantaged social positions as well as their attitudes, including a broad disassociation from science and PES.

This research was carried out with the hope that by contributing to how non-participation in PES is understood, it might be possible to improve how non-participation is perceived and addressed in PES policy and practice, as well as in other research. If public engagement with science is to be valued in Britain, it must become both physically and conceptually accessible and it must provide useful opportunities for people from all backgrounds to relate to science and engagement practices in ways that are relevant to their lives. While I do not believe this work alone is sufficient to change PES for the better, as Freire (1998; Freire & Freire, 1992) has argued, I undertook this study with critical hope; that it might be a step towards developing an empirical basis from which to call for the development of better, more inclusive PES policies and practices. As such, I see this study as a small part of a broader, on-going research agenda that seeks to research and develop equitable cultural practices, and as such, hope that others may be able to build on this work accordingly.

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## Appendices

### Appendix 1: Sample ethical information and consent forms, and ethical agreement from King's College London

#### Sample information sheet for research participants

INFORMATION SHEET FOR RESEARCH PARTICIPANTS

*REC Protocol Number: REP(EM)/08/09-52*



#### YOU WILL BE GIVEN A COPY OF THIS INFORMATION SHEET

#### Science and the inclusive society: how do UK minority socio-cultural groups experience public engagement with science and technology?

I would like to invite you to take part in this postgraduate research project. You should only take part if you want to; choosing not to take part will not disadvantage you in any way. Before you decide whether you want to take part, it is important for you to understand why the research is being done and what taking part will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please feel free to ask me if there is anything that is not clear or if you would like more information (see contact details below).

- **Research aims:** This project will explore how people from minority ethnic backgrounds and socio-economically disadvantaged backgrounds experience science events. Little is known about how people from different backgrounds experience science events and what they think about it. Your participation is essential to this research which hopefully will help to improve science events and develop better strategies for inclusive and efficient work techniques.
- **Who might participate?** People living in Southwark from minority ethnic backgrounds, over the age of 16 are invited to participate. People of all ages (16 years of age or more), both women and men, are invited to get involved in the project.



- **What are participants invited to do?** You are invited to take part in a focus group, with between 6 to 8 people, where the issues involved in the project can be talked about (how do people see science, what do people think about taking part in science decision making, whether people like to go to science events or activities?). You are invited to raise your own issues about what is important to you, your family and community. This focus group will take about 1 hour. After taking part in a focus group, you are invited to visit a science ‘event’ with the researcher, and/or take part in a follow up interview. These will be arranged at your convenience, with visits lasting around 2 hours and interviews around 30 minutes.
- In order to gather information, the focus group will be recorded and transcribed. All audio recordings will be erased after transcription and all transcripts will be made anonymous. The data will be stored securely in the Department of Education and Professional Studies at King’s College London and will be accessible only to me and my supervisors (Dr Anwar Tlili and Dr Justin Dillon).

It is up to you to decide whether to take part or not. If you decide to take part you are still free to withdraw at any time and without giving a reason.

You will also be able to withdraw from the research project after you have taken part, until August first, 2010, when I will start analysing the data. If you wish withdraw please contact me using the details below.

If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If this study has harmed you in any way you can contact King's College London using the details below for further advice and information:

#### Contact details

- Emily Dawson , Tel: 0207 207 2948. Email: [emily.dawson@kcl.ac.uk](mailto:emily.dawson@kcl.ac.uk)
- Dr Anwar Tlili and Dr. Justin Dillon, Department of Education and Professional Studies, King's College London, Waterloo Bridge Wing, Franklin-Wilkins Building, Waterloo Road, London SE1 9NH, United Kingdom. Tel: 020 7848 3096; Fax: 020 7848 3182

## Sample consent form for research participants

### CONSENT FORM FOR PARTICIPANTS IN RESEARCH STUDIES



Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.

**Title of Study: Science and the inclusive society: how do UK minority socio-cultural groups experience public engagement with science and technology?**

King's College Research Ethics Committee Ref: REP(EM)/08/09- 52

- **Thank you for considering to take part in this research. The person organizing the research must explain the project to you before you agree to take part.**
- **If you have any questions arising from the Information Sheet or explanation already given to you, please ask the researcher before you decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.**
- **The information you have submitted may be published as a report and you will be sent a copy. Please note that confidentiality and anonymity will be maintained and it will not be possible to identify you from any publications.**
- ***I understand that if I decide at any other time during the research that I no longer wish to participate in this project, I can notify the researchers involved and be withdrawn from it immediately without giving any reason. Furthermore, I understand that I will be able to withdraw my data up until the point stated on the Information Sheet.***
- ***I consent to the processing of my personal information for the purposes explained to me. I understand that such information will be treated in accordance with the terms of the Data Protection Act 1998.***

**Participant's Statement:**

I \_\_\_\_\_

**agree that the research project named above has been explained to me to my satisfaction and I agree to take part in the study. I have read both the notes written above and the Information Sheet about the project, and understand what the research study involves.**

**Researcher's Statement:**

**I, Emily Dawson, confirm that I have carefully explained the nature, demands and foreseeable risks (where applicable) of the proposed research to the volunteer.**

**Contact details**

- Emily Dawson , Tel: 0207 848 3192. Email: [emily.dawson@kcl.ac.uk](mailto:emily.dawson@kcl.ac.uk)
- Dr Anwar Tlili and Dr. Justin Dillon, Department of Education and Professional Studies, King's College London, Waterloo Bridge Wing, Franklin-Wilkins Building, Waterloo Road, London SE1 9NH, United Kingdom. Tel: 020 7848 3096; Fax: 020 7848 3182

**Letter of ethical approval from King's College London for this study**

Emily Dawson

Department of Education and Professional Studies

3<sup>rd</sup> March 2009



Dear Emily,

**REP(EM)/08/09-52 Science and the inclusive society: how do UK minority socio-cultural groups experience public engagement with science and technology?’**

Thank you for sending in the amendments requested to the above project. I am pleased to inform you that these meet the requirements of the E&M Research Ethics Panel and that full approval is now granted. Please ensure that you follow all relevant guidance as laid out in the King's College London *Guidelines on Good Practice in Academic Research*

([http://www.kcl.ac.uk/college/policyzone/attachments/good\\_practice\\_May\\_08\\_FINAL.pdf](http://www.kcl.ac.uk/college/policyzone/attachments/good_practice_May_08_FINAL.pdf))

For your information ethical approval is granted until 31st August 2011. If you need approval beyond this point you will need to apply for an extension to approval at least two weeks prior to this explaining why the extension is needed, (please note however that a full re-application will not be necessary unless the protocol has changed). You should also note that if your approval is for one year, you will not be sent a reminder when it is due to lapse. If you do not start the project within three months of this letter please contact the Research Ethics Office. Should you need to modify the project or request an extension to approval you will need approval for this and should follow the guidance relating to modifying approved applications:

<http://www.kcl.ac.uk/research/ethics/applicants/modifications.html>

Any unforeseen ethical problems arising during the course of the project should be reported to the approving committee/panel. In the event of an untoward event or an adverse reaction a full report must be made to the Chairman of the approving committee/review panel within one week of the incident. Please would you also note that we may, for the purposes of audit, contact you from time to time to ascertain the status of your research.

If you have any query about any aspect of this ethical approval, please contact your panel/committee administrator in the first instance (<http://www.kcl.ac.uk/research/ethics/contacts.html>). We wish you every success with this work.

With best wishes,

Yours sincerely

Daniel Butcher  
Research Ethics Administrator

## Appendix 2: Participants and associated research methods

### Full list of participants and associated research methods

Community group	Stated country of origin	Pseudonym	Gender	Associated research methods
Sierra Leonean	Sierra Leone	Abdou	Male	Interviews (n = 5), focus group
Sierra Leonean	Sierra Leone	Kadiatu	Female	Focus group
Sierra Leonean	Sierra Leone	Fatimata	Female	Focus group
Sierra Leonean	Sierra Leone	Ibrahim	Male	Focus group
Sierra Leonean	Sierra Leone	Ndapi	Male	Focus group
Sierra Leonean	Sierra Leone	Osmann	Male	Focus group
Sierra Leonean	America / Britain	Thomas	Male	Interview, focus group
Sierra Leonean	Sierra Leone	Hawa	Female	Interviews (n = 3), focus group, accompanied visit
Sierra Leonean	Sierra Leone	Josephine	Female	Interview, accompanied visit
Sierra Leonean	Sierra Leone	Momodu	Male	Accompanied visit
Sierra Leonean	Sierra Leone	Mama Kamara	Female	Accompanied visit
Sierra Leonean	Sierra Leone	Mama Sesay	Female	Accompanied visit
Sierra Leonean	Sierra Leone	Mama Koroma	Female	Accompanied visit

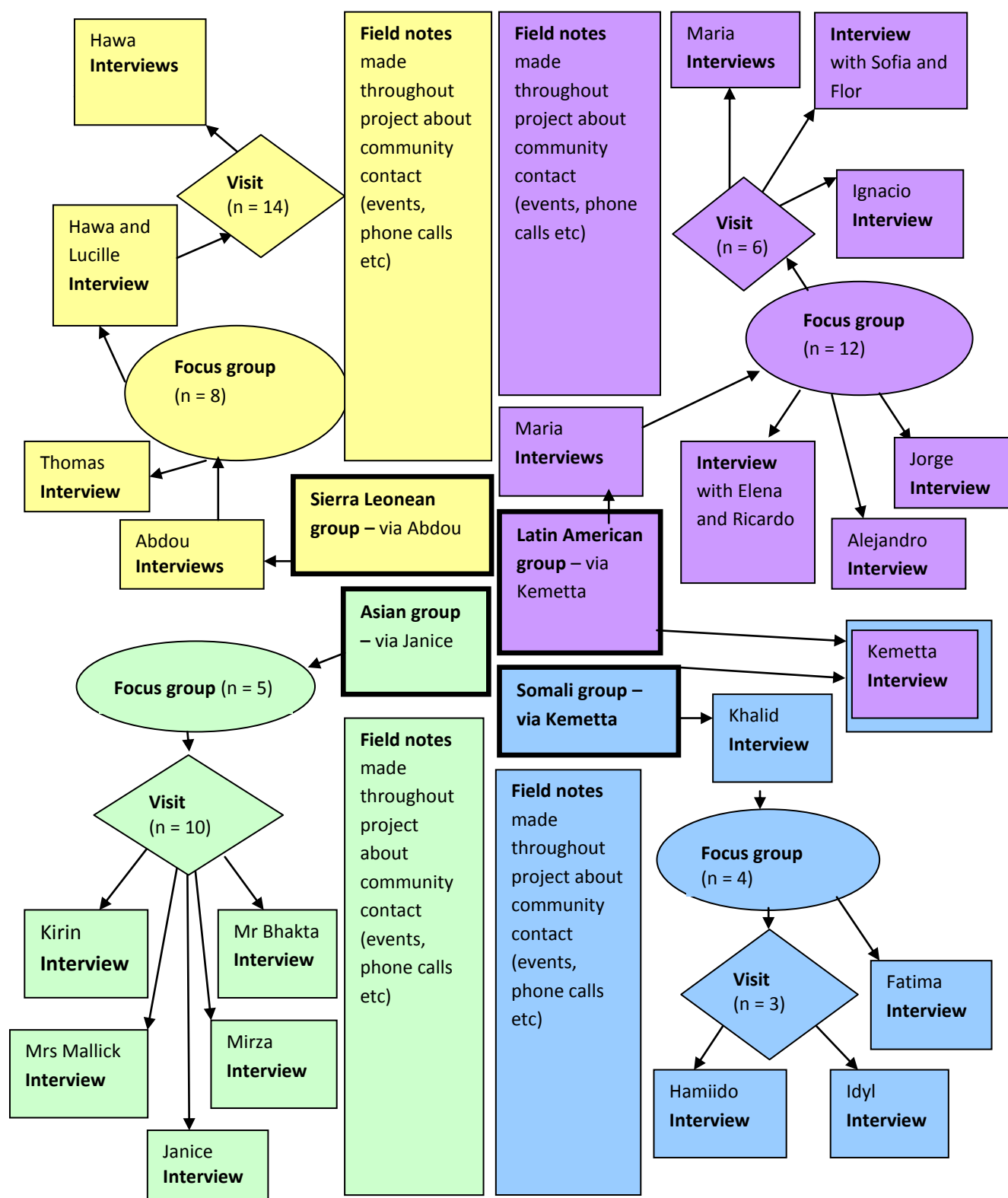
Community group	Stated country of origin	Pseudonym	Gender	Associated research methods
Sierra Leonean	Sierra Leone	Mama Turay	Female	Accompanied visit
Sierra Leonean	Sierra Leone	Mama Bangura	Female	Accompanied visit
Sierra Leonean	Sierra Leone	Mama Samura	Female	Accompanied visit
Sierra Leonean	Britain	Hafa ( <i>child</i> )	Female	Accompanied visit
Sierra Leonean	Britain	David ( <i>child</i> )	Male	Accompanied visit
Sierra Leonean	Britain	Jake ( <i>child</i> )	Male	Accompanied visit
Sierra Leonean	Britain	Robert ( <i>child</i> )	Male	Accompanied visit
Sierra Leonean	Britain	Lucy ( <i>child</i> )	Female	Accompanied visit
Latin American	Colombia	Maria	Female	Interviews (n = 5), accompanied visit
Latin American	Colombia	Ignacio	Male	Interview, focus group, accompanied visit
Latin American	Venezuela / Colombia / Britain	Sofia	Female	Interview, accompanied visit
Latin American	Venezuela / Colombia / Britain	Flor	Female	Interview, accompanied visit
Latin American	Britain	Paola ( <i>child</i> )	Female	Accompanied visit
Latin American	Britain	Valentina ( <i>child</i> )	Female	Accompanied visit
Latin American	Colombia	Alejandro	Male	Focus group, interview

<b>Community group</b>	<b>Stated country of origin</b>	<b>Pseudonym</b>	<b>Gender</b>	<b>Associated research methods</b>
Latin American	Brazil	Ricardo	Male	Focus group, interview
Latin American	Mexico	Elena	Female	Focus group, interview
Latin American	Bolivia	Jorge	Male	Interview
Latin American	Colombia	Luz	Female	Focus group
Latin American	Colombia	Beatriz	Female	Focus group
Latin American	Colombia	Ana Maria	Female	Focus group
Latin American	Colombia	Diego	Male	Focus group
Latin American	Colombia	Luis Diego	Male	Focus group
Latin American	Germany	Anna Clara	Female	Focus group
Latin American	Colombia	Juan	Male	Focus group
Latin American	Colombia	Felipe	Male	Focus group
Asian	South Africa/ India	Latika	Female	Focus group, accompanied visit
Asian	Kenya / India	Kirin	Female	Focus group, accompanied visit, interview
Asian	Uganda / India	Mr Bhakta	Male	Accompanied visit, interview
Asian	Pakistan	Mrs Mallick	Female	Accompanied visit, interview



<b>Community group</b>	<b>Stated country of origin</b>	<b>Pseudonym</b>	<b>Gender</b>	<b>Associated research methods</b>
Asian	Pakistan	Mirza	Female	Accompanied visit, interview
Asian	India	Meera	Female	Focus group
Asian	India	Sarasa	Female	Focus group
Asian	India	Jyoti	Female	Focus group
Asian	Pakistan	Ali	Male	Accompanied visit
Asian	Pakistan	Habiba	Female	Accompanied visit
Asian	India	Mrs Gupta	Female	Accompanied visit
Asian	India	Mrs Chandur	Female	Accompanied visit
Asian	India	Mrs Taank	Female	Accompanied visit
Somali	Somaliland	Khalid	Male	Interview
Somali	Britain	Fatima	Female	Interview, focus group
Somali	Somalia	Ali	Male	Focus group
Somali	Somalia /Djibouti	Idyl	Female	Focus group, accompanied visit, interview
Somali	Somalia	Hamiido	Female	Focus group, accompanied visit, interview
Somali	Somalia	Nadifa	Female	Accompanied visit
Gatekeeper for Somali and Latin American groups	British Caribbean	Kemetta	Female	Interview
Gatekeeper for Asian group	British Caribbean	Janice	Female	Interview

**Diagram of snowball sample connections, starting in the middle, with associated data collection methods and participants**



### Appendix 3: Background to the accompanied visits

#### A list of PES activities in London in 2010 for planning accompanied visits

This list was created after initial meetings with community group members to provide clear examples of the places that could be involved in the accompanied visits. Visit destinations were discussed at length with each group, including places not on this list, for example the Chelsea Flower Show. PES activities in political contexts were not included on the list because it became evident through meetings and focus groups that the people who worked with me were not aware of or interested in such events: what they did recognise were museums, science centres, zoos, aquaria and botanic gardens. Because several gatekeepers saw this list as a useful resource, it includes details that might be useful to them in the future, that are not directly related to the project.

#### Central London

- The Wellcome Collection - <http://www.wellcomecollection.org/> exhibitions, tours, talks all based around the collection of objects left by Henry Wellcome. Probably better for adults. Free. On the Euston Road, opposite Euston Station.
- Natural History Museum - <http://www.nhm.ac.uk/>. Cromwell Road, South Kensington, London. This museum has lots of galleries with objects from nature, including animal skeletons, rocks, plants, models of animals, dinosaurs and so on. It's the oldest 'science' museum in the UK and the biggest in London. Free. Good for kids, families etc. Basement with interactive 'nature' laboratories for kids.
- British Museum - <http://www.britishmuseum.org/>. Great Russell Street, London. This museum has a whole range of things, as well as special exhibitions. Good for kids who like to look at things like Mummies, have kids packs you can pick up (not sure if they're free or not). Free entrance.
- The Chelsea Physic Garden - <http://www.chelseaphysicgarden.co.uk/>. 66 Royal Hospital Road, Chelsea, London. This is an outdoor museum about medical herbs. It's a garden with lots of different herbs and plants that people have used for different illnesses. Not free, best botanic garden in London, unless you go to Kew gardens. Good for kids and adults. (Adult ticket = £8.00).

- The Centre of the Cell - <http://www.centreofthecell.org/pages.php?pid=1>. Whitechapel, London. This is a hands-on science centre about cells. Visits last about an hour, are led by one of the centres team and involve going into a 'pod gallery', where you watch a short show and then do hands-on activities focused on learning how cells work and what they do. Probably best for school groups. Free.
- London Zoo - <http://www.zsl.org/>. Regent's Park, Camden, London. This is the main zoo in London. They house live animals from around the world, including birds, reptiles, monkeys, fish and insects and have lots of exhibitions about different animals. Not free, but great for kids and adults. (Summer time adult ticket = £20.50).
- Sealife, London Aquarium. <http://www.sealife.co.uk/london>. Massive aquarium in Lambeth. Not free, but good for kids and adults. (Adult ticket = £17.14).
- The Royal Institution - <http://www.rigb.org/registrationControl?action=home>. 21 Albemarle Street. This institution houses a newly redesigned museum and runs events like the Christmas lectures where scientists present their research to a televised audience. Free, but better for adult discussions than for kids overall.
- Science Museum- <http://www.sciencemuseum.org.uk/>. Exhibition Road, South Kensington, London. This museum has lots of galleries with a mixture of different historical and modern objects relating to science, technology and peoples lives. There are a lot of interactive exhibits with computer screens and activities for visitors to do. Second biggest science museum in London. Free, great for kids, lots of hands on science activities.

### **South east London**

- The Horniman Museum - <http://www.horniman.ac.uk/>. 100 London Road, Forest Hill, London. This museum has galleries on a mixture of subjects, including musical instruments, objects from around the world, an African worlds exhibition as well as a natural history gallery, an aquarium, a small zoo/farm, a big garden and medicinal garden display. Good for adults and kids. Free.
- Vauxhall City Farm. <http://www.vauxhallcityfarm.org/>. and Surrey Docks City Farm <http://www.surreydocksfarm.org.uk/>. Both local (ish) city farms. Both are free and good for kids. Lots to do, basic farm animals including cows, horses, goats etc.

- The Centre for Wildlife Gardening,  
<http://www.wildlondon.org.uk/Naturereserves/CentreforWildlifeGardening/tabid/125/Default.aspx>. 28 Marsden Road. This is a smaller out door centre with a mixed wildlife garden, some raised bed gardens and rather than exhibitions, it has activity sheets to follow which you can pick up inside. It's between Peckham and East Dulwich. Good for a couple of hours out with kids somewhere local. Free.
- The Old Operating Theatre - <http://www.thegarret.org.uk/>. St Thomas Street, Southwark, London. This museum is in the roof of an old church (so there might be some access issues with visiting it for older groups unfortunately). It is an original operating theatre from the 1800s, with a herb collection and original surgical instruments, as well as other historic medical objects. So weird it's actually good for kids. Not free. (Adult ticket = £5.90).

**Further away, but still just about in London:**

- Kew Gardens. <http://www.kew.org/visit-kew-gardens/index.htm>. Beautiful park with lots of activities for kids and adults. National collection of lots of different plant species. Aquarium. Tree top walks. Big glass houses. Cafes. Picnic spots. Not free (Adult ticket = £13.90).
- London Wetland Centre. <http://www.wwt.org.uk/london>. Large wildlife wetland centre in Barnes. Lots of native animals and walks and daily events including tours, animal feeding etc. Not free (Adult ticket = £10.55).

A table summarising the four accompanied visits

Community group	Institution visited	Institution type	Date, day & duration of visit	Visit Summary
Asian group (n = 11) <i>Community group members</i>	The Horniman Museum. South East London	Local museum with mixed collection: including an aquarium, ethnographic, natural history and art galleries, petting zoo, a park, hands-on workshop spaces, a shop and a café.	31.3.10 (schools Easter holiday)  Wednesday  10.45 am to 3.00 pm.	Mini bus between museum and community centre. Visited the aquarium, the Musical Instrument Gallery, the Africa Worlds Gallery and the Natural History Gallery, with different people visiting in different orders. Took part in a hands-on workshop with a facilitator. Picnic lunch in a separate room.
Latin American group (n = 6) <i>Family</i>	The Natural History Museum. West London.	National museum. Natural History collection with permanent and temporary exhibitions. Includes exhibitions about earth science and animals, hands-on activities, multiple cafes and shops, a small park.	23.5.10  Sunday  2.00 pm to 5.30 pm	Met family at museum. 4 arrived at 2pm, 2 more arrived at 3.30. Visited Cocoon Gallery in Darwin Centre, mixture of natural history objects and computer interactives. Visited Butterfly Explorers, immersive gallery with live butterflies and physical interactives. Bought things in shop. Bought refreshments in café. 3 of group visited

				dinosaur exhibition.
Sierra Leonean group (n = 13) <i>Freetown elders group (6), Group co-ordinators (3), children (5)</i>	The Horniman Museum. South East London	Local museum with mixed collection: including an aquarium, ethnographic, natural history and art galleries, petting zoo, a park, hands-on workshop spaces, a shop and a café.	12.6.10  Saturday  11.15 am to 12.45	Taxis to and from museum. Visited the aquarium, the Africa Worlds Gallery and the Natural History Gallery in that order. Visit cut short due to illness of group member. Buffet lunch in Elephant and Castle after visit.
Somali group (n = 3) <i>Community group members</i>	The Centre of the Cell. East London.	Science centre in a University. One gallery (the pod) with several touch screen computer interactives, two microscopes, audiovisual presentations and a facilitator. Shop.	17.6.10  Thursday  4.30 pm to 5.30 pm	Taxi to museum from community centre. Booked at time and followed the facilitated visit to the 'Pod', followed the presentations and used the computer interactives.

## Appendix 4: Coding framework for Chapter 4

### Coding framework of analysis of the roles of social contexts and social positions on non-participation in PES

Coding category	Category description
<b>1. Migration</b>	<p><b>Observations and descriptions of how migration affected participants lives, in particular their participation in PES. Includes issues around why participants migrated, issues of diasporic living such as the ‘dream of home’, transnationalism and family ties.</b></p> <p><b>1.1 UK as the land of opportunity/‘Brutal’ backgrounds</b></p> <p><b>1.2 ‘dream of home’</b></p> <p><b>1.3 Transnational identities (family and work ties)</b></p>
<b>1.1 Example</b> UK as the land of opportunity/‘Brutal’ backgrounds	<p><i>Ana Maria: I, my older brother he lives in London, in this time in Colombia, I can’t find, I had a job, but temporary, but I wanted change, but I wanted good, permanent better life than Colombia, and I said, why not coming here, study English and coming back to Colombia, more opportunities for better jobs, but no, when I came here I met</i></p> <p><i>Luz: she fell in love (both laughing)</i></p> <p><i>Ana Maria: yes, I in love, I meet my ex-husband, marry and I stay, that’s it! (Latin American Transcript #3)</i></p>
<b>1.2 Example ‘dream of home’</b>	<p><i>Lucille: I’ve seen a lady as if she knows when she came over here she cried all day all night until she was taken back to Sierra Leone, she just can’t stand the place, because over there, if you don’t have kids playing with you, walking around the garden or somewhere, you have lots of things to do, engaging yourself, they go to the farm, they plant things, they keep themselves busy</i></p> <p><i>Emily: And they know the system</i></p> <p><i>Lucille: Thank you, they know the system, they know where to go, what to do, one thing, even myself with my background, what I’m doing, I’m tempted to stop and ask for help or whatever, but most of them, it’s not their background, time doesn’t convince them, they’re far from home (Sierra Leonean Transcript #4)</i></p>
<b>1.3 Example</b> Transnational identities (in terms of	<p><i>Maria: But in everyone else’s case that extreme is sending the money back to their home country,</i></p> <p><i>Emily: So everyone is working as much as they can</i></p>



<p>ethnicity and socio-economic status)</p>	<p><i>Maria: It's not necessarily to spend here, they don't tend to spend here, it's always going home, and his nephews here, and his brother that's here, everyone, to buy property over there (Latin American Transcript #6)</i></p> <p><i>Mr Bhakta: But I am happy in all respects. I built a house back home as well, back in India. The building took two years and it's this new place, the way we want it to be, a big bungalow. Everything we require, we've got it because of the money, we've got everything. Still, you can't stay there when part of your family is here. Most of the time I spend down here, out of my 70 years, 40 years have been here (Asian Group Transcript #3)</i></p>
<p><b>2. Own capitals</b></p>	<p><b>Participants use or descriptions of their 'own' forms of capital. Includes own language skills, cultural heritage and pride, taking part in community-based cultural activities.</b></p> <p><b>2.1 Community capital</b></p> <p><b>2.2 Pride in community heritage</b></p> <p><b>2.3 Cultural difference</b></p>
<p><b>2.1 Example</b></p> <p>Community capital</p>	<p><i>Jorge: Ah, that's interesting, because it's about history as well, this is [la morenada] what we do is the [morenada], and nowadays it's the most (7.15) important dance from my city, there is a point in the year where everybody in the city stops and is dancing or watching the dancing, and it takes like 2 days and is a real stop the city, and everybody is enjoying and things, but it came from the history, it's about the history of south America as well, it's the mix with Europeans who came to south America, they bring people from Africa as well, and after all the that mixture of cultures, that phenomenon, we got the [morenada] and nowadays it's a colourful dance, the representation of carnival</i></p> <p><i>Emily: So the mask goes with the dance</i></p> <p><i>Jorge: Yeah, that's the symbol the mask, yeah</i></p> <p><i>Emily: So this symbol, that's the [morenada] for you, if you saw that</i></p> <p><i>Jorge: Yeah, yeah, absolutely, because this is a mask from someone who is [says something I can't understand] his tongue is outside because [excited/slaughtered], the origin of this dance is when, when the were slaves from Africa, working in Mines and they were marching and their chains, the sound of their chains were the rhythm that we keep, now it's a happy dancing, but that came from that these people were marching with the chains, it's of course, not really nice a starting for the dance, but</i></p>

	<p><i>nowadays it's like everybody is thinking the whole year about the carnival and how they will have the best party, yeah, it's a huge movement, the carnival</i></p> <p><i>Emily: So it's like taking history that's really sometimes horrific and making it good and celebrating what you have got</i></p> <p><i>Jorge: Yeah, in 500 years it becomes a party, but it's as well, the roots are everybody knows where, it's a part of the memory of people (Latin American Transcript #8)</i></p>
<b>2.2 Example</b> Pride in community heritage	<p><i>He (Khalid) showed me two photos, one of a group of young Somali women dressed in traditional plaid outfits and talked about them learning about their own heritage from another woman who was an actor, and how important it was for them to know about their own heritage, and he talked about a singer who was very famous in Somalia, if not here, called Maryam Mursal, who was also part of keeping Somali culture alive, (Somali Field Notes #1)</i></p>
<b>2.3 Example</b> Cultural difference	<p><i>She (Maria) described what it might be like if you are a new LA person who has just arrived in London, that your priorities are work, often as a cleaner, that then you need housing, food, and papers, and that the social side of things comes after that, and a long way down the line you might start to think about Museums etc, also with the story about the theatre and Ignacio's growing up with the theatre being the horse fair, that though not all, many people from LA's don't have the same concepts of M's and Science Centres that we might over her, although obviously some do, because such places do exist in some countries, but it depends on where you're from, which country, town or rural etc . So M's as a concept seems very removed to many people, they don't know what they are or what they're for, so it's a process of discovery for them. (Latin American Field Notes #1)</i></p>
<b>3. Our social outlook</b>	<p><b>What participants described as what they normally did, and observations of what they 'normally' did. Includes participation in community-based cultural activities, as well as spending time with family and friends, and other descriptions of their lives, and how PES is not part of their social outlook.</b></p>
<b>Example</b>	<p><i>Thomas: Yeah, they'd probably be like, fine, I'll come with you [to the museum or science centre], and maybe they'd like it, but they wouldn't be like, yeah, let's make a date next week and we're going to go to museums</i></p>

	<p><i>on our day off</i></p> <p><i>Emily: Let's make a list of all the other awesome ones we can go to</i></p> <p><i>Thomas: Yeah, it wouldn't be like that, no (pause)</i></p> <p><i>Emily: So why is that?</i></p> <p><i>Thomas: Years, years of habits, cos you do what, like, people do what, how can I say it, like, people do what they do often, if you know what I mean, like they don't usually do what they don't do (Sierra Leonean Transcript # 3)</i></p> <p><i>Idyl: I live not very far from here, Camberwell, yes, the kind of things I like doing is mainly socialising with friends, and not preferably going to science museum (laughs), but yeah, it's an area maybe I should look at from today on, yeah. (Somali Transcript #2)</i></p>
<b>4. Ethnicity</b>	<b>Observations and descriptions of the role of ethnicity in participants' lives, includes issues of racism, awareness of racism, and overlaps with issues of 'migration', 'own capitals' and 'our social outlook'</b>
<b>Example</b>	<p><i>Fatimata: But there's a probability there that it might take, that people might get into it, but it also depends on individuals like coloured people like us basically, we, um, black people normally think, for me, if you asked me if I would like to be part of what ever discussion, based on science to talk to government for them to listen, we'll always say, well, they're not going to listen to us obviously, because we're minority people, but that's our perception sometime (Sierra Leonean Transcript #1).</i></p> <p><i>Hawa: Like the media, when they go to Africa, they snap, they take photos in the worst areas, and when people see they become upset, because they know there are better places,</i></p> <p><i>Emily: So it shows the [L over talks]</i></p> <p><i>Lucille: And if that negativity of portrayal, sometimes it's ok, (07.05) if in terms of the third world, but when they do it too much, it can come out, like wait a minute, if you are there and you have friends there, you can have a lot of them there, and they are happy living there, so why can't they show us in a different, sort of... (Sierra Leonean Transcript # 4)</i></p>
<b>5. Socio-economics</b>	<b>Observations and descriptions of the role of socio-economic status, or class, in participants' lives, in particular in relation to non-participation in PES. Includes the restrictions places on participants as a result of marginalized socio-economic status. Overlaps with</b>

	<p><b>‘migration’.</b></p> <p><b>5.1 Exploitative work</b></p> <p><b>5.2 No ‘free’ time</b></p> <p><b>5.3 Need to work/poverty blocks PES opportunities</b></p> <p><b>5.4 Downward mobility</b></p> <p><b>5.5 Crime</b></p> <p><b>5.6 Unemployment</b></p>
<p><b>5.1 Example</b></p> <p>Exploitative work</p>	<p><i>Mr Bhakta: So I started a small business called Newsagent Shop. I didn’t have any money, but as we came from Uganda, they only allowed us £50 to come here for the whole family. That was the history, but I had some money from my father in law and the bank gave us a loan, the National Westminster bank, they helped me a lot, and we started a small business. The business was not that good, but I just took the place just to have shelter. We had a three bedroom up above the shop. The shop was only doing £200 a week business at that time. Once we settled, my wife started working and I was running the shop. We were open for seven days, from Monday till Sunday, and we used to work from six o’clock, first thing in the morning, till eight o’clock in the evening. (Asian Group Transcript #3)</i></p> <p><i>Maria: Or people that depend on that coming in, most people will earn something like £6/hour I suppose</i></p> <p><i>Emily: And are working multiple jobs</i></p> <p><i>Maria: Just one after the other, and because nobody is necessarily employed with one person, so there’s no concept of having breaks or routines, cos they’re all employed by different people to do the different things, so nobody actually looks out for anyone</i></p> <p><i>Emily: So no one gets a proper lunch break?</i></p> <p><i>Maria: It doesn’t work that way, it’s bitty, so if you’re, these people here will have a cleaner who turns up, and they won’t know anything about him</i></p> <p><i>Emily: He just turns up?</i></p> <p><i>Maria: Most people are pretty knackered all the time, and then, the only thing is, if they get to go out, say on a Saturday night, to one of the Latin places and dance all night ‘til 4 in the morning, that’s how they unwind, the only, or there are a lot of people playing football. (Latin American Transcript #6)</i></p>
<p><b>5.2 Example</b></p>	<p><i>Luis Diego : (laughs) For me it’s difficult, because I’m working</i></p>

no 'free' time	<p><i>Emily: So you're working...</i></p> <p><i>Luis Diego: All the time, the weekends I stay with my family, because in the normally in the week I sometimes see my wife only 1 hour 2 hours, and I have to take care of my baby when she's going to work, I stay home (43.33) it's very very difficult you know. (Latin American Transcript # 3)</i></p>
<b>5.3 Example</b> Need to work/poverty blocks PES opportunities	<p><i>Kemetta: Yeah, so I have a real struggle with that, to move people from A to B, because if they're only getting information and sources from people they see on a day to day basis, which is not a lot if they're in a cleaning job, like you said, they've not got a lot of leisure time or money or funds, you know,</i></p> <p><i>Emily: And it is, how do you get out of that, if you're working 4 or 5 jobs,</i></p> <p><i>Kemetta: It is, it must be, but they don't care, they need the money, need to pay their rent, London is an expensive place to live. (Gatekeeper Transcript # 1)</i></p>
<b>5.4 Example</b> Downward mobility	<p><i>Osmann: Like, like my little brother, he's just 24, he graduated with a BSc in environmental sciences, but he hasn't got a job to do,</i></p> <p><i>Emily: Yeah</i></p> <p><i>Osmann: So he has to apply to a bank to work there, how can he, an environmental science person, to go to a counter, to work as a banker</i></p> <p><i>Emily: Yeah</i></p> <p><i>Osmann: Because of the job opportunities, so it's like, you see someone applying to university to do science, you say, my friend, I did this thing, I haven't got a job, why you do this thing? go this way</i></p> <p><i>Emily: Yeah</i></p> <p><i>Osmann: There's no work there. (Sierra Leonean Transcript # 1)</i></p>
<b>5.5 Example</b> Crime	<p><i>Abdou: Best in quotations, yeah, that does not mean even people from poorer backgrounds are not best students but they don't have the opportunities, so they tend to lose hope anyway that, well, that my friend went to university, he's still unemployed, he still goes to the job centre for his fifty pounds a week so why should I waste my time, why should I not get involved in drugs, selling drugs and all those things, which brings me quick money and gives me respect within the community that I am part of. (Sierra Leonean Transcript # 2)</i></p>
<b>5.6 Example</b> Unemployment	<p><i>Alejandro: Financial crisis, Latin America's been in a financial crisis since it become Latin American, and now we in this country we are</i></p>

	<i>paying for the financial crisis of the people with the money, [wind], I'm feeling that squeeze, I've been unemployed, I was unemployed for over a year, having difficulties finding a job (4.26) seeing how difficult it is to live on benefits. (Latin American Transcript #9)</i>
<b>6. Age</b>	<b>Observations and description of the role of age in participants' lives and in relation to non-participation in PES</b>
<b>Example</b>	<i>Kirin: To tell the truth we admire people who are growing up, younger people, and learning and helping us in life, everyday life, what medicines are discovered (3.04), what illnesses are, what nature gives us, we are very fascinated to see all those things, and we admire and fascinating how the people's brains work, but now I think we have passed the stage of (laughing) you know like I said, so I don't know if we'll be able to keep up with this, we don't even feel like cooking these days (laughing a lot). (Asian Group Transcript # 1)</i>
<b>7. Gender</b>	<b>Observations and description of the role of gender in participants' lives and in relation to non-participation in PES</b>
<b>Example</b>	<i>Maria: It's difficult just to reserve the time, but just to reserve that time, just to say we're going to go out and we're going to do something nice Emily: Yeah, and the concept of leisure time Maria: That's it, Emily: In all the groups I've talked to Maria: It's eaten into now, as a family, as a whole family, you might have the mum doing it, but it's not the same doing it on your own, it's a bit stressful really, Flor: Right, shall we go inside now? Maria: I say that, I say that I won't go out of the house unless I've got 90 adults with me. (Latin American Transcript #6)</i>
<b>8. Lack of information blocks opportunities</b>	<b>Observations and description of the role of information in participants' lives and in relation to non-participation in PES, includes issues of alternative media channels. Overlaps with 'Migration' and 'Socio-economics'.</b>
<b>Example</b>	<i>Fatima: I don't know, probably with campaigning or maybe um more advertisement, or more interesting things happening in the museum may lead to people may be thinking, oh I would like to go, because rarely like a, like a leaflet saying, oh, come to the museum, there's going to be this</i>

	<p><i>interesting debate about this, unless you're tied to the museum and you know things about the museum and it's part of your social outlook, then you know what's happening in it, but if you don't know anything about the museum and it's not part of your social outlook then you don't know what's happening in the museum</i></p> <p><i>Emily: Yeah, and you'd never look it up?</i></p> <p><i>Fatima: You'd never look it up, you wouldn't have no need to because it's not something you do, but if a leaflet came to you or somebody said, oh I went to the museum the other day and we did this interesting interactive thing, or we did a debate about everyone, you know, a general debate</i></p> <p><i>Emily: Yeah</i></p> <p><i>Fatima: It'd be, yeah, I think it's the publicity, museums don't have great publicity in terms of letting people know the events and things they do, so unless you're into museums you're not going to know. (Somali Transcript # 6)</i></p>
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## Appendix 5: Coding framework for Chapter 5

### Coding framework of analysis of participants personal views and experiences of PES and non-participation in PES

Coding category	Category description
<b>1. Science</b>	<p><b>Observations and descriptions of how participants related to, or viewed science, including their prior experiences</b></p> <p><b>1.1 Science and school/Youth framing of science</b></p> <p><b>1.2 Science employment</b></p> <p><b>1.3 Science trajectories</b></p> <p><b>1.4 Science in ‘real life’/science is everything</b></p> <p><b>1.5 Scientists vs. us</b></p> <p><b>1.6 Science as elitist</b></p> <p><b>1.7 Science is not for me</b></p>
<b>1.1 Example</b> Science and school	<p><i>Kirin: I took that subject [science], but now it’s all going (laughing) yeah, can’t remember,</i></p> <p><i>Emily: And what about you guys?</i></p> <p><i>Jyoti: Same thing yeah, it was very [can’t hear] thought it was very good</i></p> <p><i>Kirin: As a subject in school you know</i></p> <p><i>Meera: Yes yes</i></p> <p><i>Kirin: We are interested but sometimes our knowledge is not so high like you are,</i></p> <p><i>Jyoti: Yes</i></p> <p><i>Kirin: Taking interest in</i></p> <p><i>Jyoti: And it’s a long time ago studies now, a long time ago it was finished already, so we don’t remember (laughing)</i></p> <p><i>Meera: I like to [can’t hear]</i></p> <p><i>Emily: Yeah you like the experiments?</i></p> <p><i>Meera: Yeah</i></p> <p><i>Kirin: You know darling, amongst us marriage is the first thing that parent says</i></p> <p><i>Jyoti: Yeah</i></p> <p><i>Kirin: ‘You’re ready now, get married now’ (laughing) (Asian Group Transcript #1)</i></p> <p><i>Abdou: Not just in Sierra Leone, when I came here, Kadiatu’s son for example, I went to his parents evenings and all that and spoke to his</i></p>



	<p><i>teachers two years in a row now, and he seems to be doing very well in history and other subjects and he tends to like be up to date with his work in history and other subjects, but with science he's got about six, seven course work that he has not submitted, you know, so that again, you know, tells a different story, why is he so passionate about history, why is he so passionate about business, why is he so passionate about citizenship but not (pause)</i></p> <p><i>Emily: What is the problem with science</i></p> <p><i>Abdou: What is the problem with science, you know, I never ask him one to one, because maybe you give him a lee way, we just push him to say 'try', but for him to have 6 or 7 course work maybe from year ten and all that</i></p> <p><i>Emily: So he's a teenager now,</i></p> <p><i>Abdou: Yeah, he is he's doing his GCSE's, and he's still got backlog, you know, even when we went there, they say 'ok, we're going to give you time to complete it', he'll say 'yes yes yes', he will take two weeks to do one, and then we have to chase him, so it means that it's not interesting, that's the problem you know (SLT#2)</i></p>
<b>1.2 Example</b> Science employment	<p><i>Abdou's point was that even with interest and science qualifications Ibrahim couldn't get a job in environmental science in SL or UK, and was stuck doing different work anyway, living in a poorer borough, and he actually thought that was because people who did do science actively made it harder for everyone else to get into and kept it elitist and even Ibrahim did this, because he didn't say to Abdou and Thomas that it was something everyone could do and show them the NHM and how interesting it all was, instead he just told them off for being lazy and not trying hard enough to understand science. (Sierra Leonean Field Notes #4)</i></p>
<b>1.3 Example</b> Science trajectories	<p><i>Mr Bhakta: She just brought the boy here. He studied at a local school and everything, and because his father was clever, he was clever. He is a pharmacist now. He has a pharmacy shop. (Asian Group Transcript #3)</i></p> <p><i>Fatimata: To medicine, I'll tell you, my boyfriend is at medicine school and when he started his course there were about 30 of them in his lessons, in his department, but he's almost finishing now but they've got like 10 people left in there, and he's one of the very few that actually want to go through and finish next year, but the point is when I ask him 'oh, why do</i></p>

	<p><i>you guys just drop out all the time?’ he goes, ‘you don’t have a clue do you’ (laughs) and I’m like ‘ok’, but that says a lot, because basically I have to say there is so much hassle that he has to go for medical training at the hospital and then he has to come back, he has to do research, he has to study, and then the equipments not there for him to study very well, the books are not there, or up to date you know, (Sierra Leonean Transcript #1)</i></p>
<b>1.4 Example</b> Science in ‘real life’/Science is everything	<p><i>Sofia: Don’t know really, I think to some degree everything’s got science in it, cos it goes hand in hand with research, cos research goes into absolutely everything, from marketing to I don’t know, hair stuff, new mascara that comes out, all that stuff has got a whole team of scientists who do all the work for it, so I’d say kind of everyone really (Latin American Transcript #6)</i></p>
<b>1.5 Example</b> Scientists vs. us	<p><i>Idyl: Mmm, science progress is always the main, the intention is to discover more and then to get some results out of it, um, although the, it’s not always, this can lead to a big problem, while you’re trying to discover progress, and that’s exactly what I meant actually</i></p> <p><i>Emily: Yeah? And what about, could you unpick a bit more</i></p> <p><i>Fatima: Um, I don’t know, I think those who are like, involved in science, their main aim, or maybe one of the things that if they want to continue in science is to see how far they can take science, how far they are able to discover or do something that involves science, whether that is trying to find a cure for cancer or whether that means cloning, they’re trying to stretch the boundaries of science, and as a, as a normal individual I’m fascinated to see how far they can stretch science and how far they can go beyond science, but, um, with each issue there comes a moral responsibility and whether normal individuals would set their findings or the results of science, or cloning issue or if they find the cure for cancer (48.49) then that would be something that science was used in a positive way, and no one would disagree with that, but if it’s used in a way that of cloning,</i></p> <p><i>Idyl: Mmm, it contradicts with the</i></p> <p><i>Fatima: You have obviously, yeah, you’ll have those who are hard core scientists who are more than happy because science has been able to discover something such as this and you’ll have those who think more with their sense of right or wrong, whether this is something that we should be meddling in, or whether we should leave it along (Somali Transcript 2)</i></p>

<b>1.6 Example</b> Science as elitist	<p><i>Science has been very elitist back in SL. For example, Abdou reckons there's about 70 doctors in the whole of Sierra Leone, and that if your relatives get ill, you'd rather send them to Guinea etc so that they get better treatment, and that this very small number of doctors is because it's always been a very elitist profession. For example, he contrasted the number of doctors with the huge number of nurses (who in SL only get paid about \$20 a week, that there's not even enough of them and that families will go into the hospitals to care for their relations because everyone knows the nurses can't do it all). (Sierra Leonean Field Notes #2)</i></p>
<b>1.7 Example</b> Science is not for me	<p><i>Mirza: I am not a science person, believe me, but I've been to the Science Museum as well. Whereas we spent more time at the butterfly farm, I spent less time at the Science Museum. I find it more boring, and it was too deep for Habiba. So she wasn't very keen about it.</i></p> <p><i>Emily: So it was harder to get involved with?</i></p> <p><i>Mirza: That's right.</i></p> <p><i>Emily: So why do you say you are not a science person?</i></p> <p><i>Mirza: Science has never been my good subject when I was a girl. So that's why I said it.</i></p> <p><i>Emily: So it comes from your idea of school?</i></p> <p><i>Mirza: Yes.[...] Science is for people who want to be doctors, do biology, those sorts of things, who want to learn inside out. I think science is for them. There are lots of different things you can learn from science, but it's definitely not for me. I find it too much for my head. (Asian Group Transcript #5)</i></p>
<b>2. PES in political contexts</b>	<p><b>Observations and descriptions of how participants related to, or viewed PES in political contexts, (such as local or national consultations on socio-scientific issues like pollution) including prior experiences, which were limited.</b></p> <p><b>2.1 Not interested in science politics</b></p> <p><b>2.2 Powerlessness/Socio-scientific issues are out of our hands</b></p> <p><b>2.3 Voicelessness</b></p>
<b>2.1 Example</b> Not interested in science politics	<p><i>Alejandro: Well first of all this is the first time someone asked me this question (laughs) it's a beginning, I never thought about this, yes, the importance of medical or science research, for me it's something that is a marginalized subject, it's a subject very far from my reality, from what I</i></p>

	<p>do, and I'm basically the way I see it is that research comes to nothing when politicians take decisions, (Latin American Transcript #9)</p>
<p><b>2.2 Example</b></p> <p>Powerlessness/Socio-scientific issues are out of our hands</p>	<p>Emily: But, what is it that, yeah, again, turns you off or</p> <p>Idyl: Mmm,</p> <p>Fatima: No, for me, personally, if it's like, care about the environment and stuff, I do like, personally I do recycle, and I don't throw anything on the floor like any rubbish, I would always put it in the bin, so personally I'm aware and I do my part, but globally, I couldn't care less (laughs) it's a really bad attitude to have, I don't know, it just, I don't know, if it doesn't bother you, like, immediately, of it you don't see the effects on a day to day basis, then it's not really</p> <p>I: You sit back (laughs)</p> <p>Emily: Yeah</p> <p>Idyl: Yeah, because yeah, personally I think, people out there, although they need help from each of us to like contribute the way we can, I still believe them that they can do the job on their own and wait for the result</p> <p>Fatima: They don't need help from us, we're only three people, out of a billion, (Somali Transcript #2)</p> <p>Lucille: Why the nuclear power, why? Why do we need it? Do we actually need it? That's my question, if they can say yes to me, and give me some reason so it, maybe I'll go with that, but so far I don't see a reason why we need it. And all that I can see is danger ahead of it, so I'm not interested in things like that, and in genetically modified food, you've lost me (laughs), I don't know, the parts where I come from we don't do that kind of thing</p> <p>Hawa: Yeah</p> <p>Lucille: So, we do eat them, because we have no choice, because we live here and we're poor, even for me, we don't have the means of, even with the organic things, is it true if they are organic? (Sierra Leonean Transcript # 4)</p>
<p><b>2.3 Example</b></p> <p>Voicelessness</p>	<p>Fatimata: Yeah, um, it's very important, for people to feel they're important enough to museums that whatever they have to say has an impact on a real decision, if you are gonna make a decision about something that affects all of us, and when I speak to you, you don't want to listen to me, why would I want to talk to you in the first place, I wouldn't want to say anything, and whatever else has to come from [?] I'll tell you</p>

	<p><i>I'm not going to be going to be involved because I'm not going to be heard, I like when I say something I get heard, and if not then I'm not important, if whatever I say doesn't have anything to do with this decision., (Sierra Leonean Transcript #1)</i></p>
<b>3. PES in educational, cultural and social contexts</b>	<p><b>Observations and descriptions of how participants related to, or viewed PES in educational, cultural and social contexts, (such as museums, science centres, science festivals, botanic gardens, zoos and aquaria) including their prior experiences.</b></p> <p><b>3.1 Awareness informal science learning environments</b></p> <p><b>3.2 Relevance and information</b></p> <p><b>3.3 Childhood framing</b></p> <p><b>3.4 Eurocentrism/cultural imperialism</b></p> <p><b>3.5 Not for me because of social position</b></p>
<b>3.1 Example</b> Awareness informal science learning environments	<p><i>Kirin: yeah, lovely cafe, aquarium, yes, all instruments, all sitars, guitar, um,</i></p> <p><i>Meera: Ah, everything Indian,</i></p> <p><i>Sarasa: I'm living nearby there, but I've never, I haven't seen the place (laughing)</i></p> <p><i>Kirin: You pass it by</i></p> <p><i>Emily: So how long have you lived near there?</i></p> <p><i>Sarasa: Ten years</i></p> <p><i>Emily: Ten years,</i></p> <p><i>Sarasa: Still I haven't seen the place</i></p> <p><i>Emily: What about the park, do you ever go in the park</i></p> <p><i>Sarasa: It's a lovely park, I can see it by from the car, when we pass by</i></p> <p><i>Kirin: Oh yeah, so you're very near to it then</i></p> <p><i>Sarasa: I can see so many people are there, going there, but I haven't got time to go (laughing) (Asian Group Transcript #1)</i></p> <p><i>Ana Maria, didn't like Museums so much, neither of them had been to the Cumming Museum, and laughed in a sort of 'naughty' way, about how close it was and how they'd never been! But Luz talked about having been to the British Museum very recently with her family. (Latin American Field Notes #2)</i></p>
<b>3.2 Example</b> Relevance and	<p><i>Thomas: Yeah, I think whether or not you go to museums, science is going to happen anyway, and I guess, at any time in your life when it's relevant</i></p>

information	<p><i>you'll look into it, but if it's not relevant then surely you can't be bothered about it. Like how I said when people get sick, they tend to like research their disease or research that part of their body, and things like that, so something's happened that has made you want to, yeah, and is that a bad thing? (Sierra Leonean Transcript #3)</i></p> <p><i>Hawa: Maybe they need to, like science and the museums, they need to advertise them, more broad, you say you used to work there, you see the type of people coming in,</i></p> <p><i>Lucille: That goes there, it's not us</i></p> <p><i>Hawa: So now you need to target the groups that don't go</i></p> <p><i>Lucille: Mmhmm</i></p> <p><i>Hawa: And give them an education (21.58)</i></p> <p><i>Lucille: Give them a meaning to go there</i></p> <p><i>Emily: Yeah?</i></p> <p><i>Hawa &amp; Lucille: Yes</i></p> <p><i>Hawa: Maybe brochures, like (SLT#4)</i></p>
<b>3.3 Example</b> Childhood framing	<p><i>MB: Nice collection, for people, especially young boys to learn how the creature has been transformed from one stage to another stage as the time passed by how they are, like here (Asian Group Transcript #2)</i></p> <p><i>Jorge: The museum for the kids is quite good because the interaction with the things, I think for kids it's wonderful, they can learn by experimenting, I think to put things for them, like very accessible, is the right thing for a kid</i></p> <p><i>Emily: And what if you're not a kid</i></p> <p><i>Jorge: It's like, i don't know, it's like, I think, I see that like a playground for kids, but not really for, but then other the other hand, a boring museum with lots of information it's not really good for anyone (Latin American Transcript #8)</i></p>
<b>3.4 Example</b> Eurocentrism/cultural imperialism	<p><i>Mrs Mallick: Actually museums, most of the time it is about Asia or Egypt or India, most of that is in the museums.</i></p> <p><i>Emily: So most of the things in there are about the cultures anyway.</i></p> <p><i>Mrs Mallick: Yes. You have been to museums, you have noticed these things, most of them are in Asia, and some history, like science, this is European.</i></p> <p><i>Emily: So the science stuff is more European?</i></p>

	<p><i>Mrs Mallick: Yes, [unclear] and things. (Asian Group Transcript #4)</i></p> <p><i>Emily: Does it only appeal then...</i></p> <p><i>Lucille: To them, yeah, not to us, not to other people</i></p> <p><i>Emily: White Europeans?</i></p> <p><i>Lucille: I think most of it appeals to you guys, (Sierra Leonean Transcript #4)</i></p>
<p><b>3.5 Example</b></p> <p>Not for me because of social position</p>	<p><i>Mrs Mallick: If I want to go there, I can arrange for me, but I don't know.</i></p> <p><i>Emily: Would you go on your own?</i></p> <p><i>Mrs Mallick: No, no, I can't go on my own. If my husband comes with me, but that's why I came here. [unclear]</i></p> <p><i>Emily: So you wouldn't do that kind of thing on your own?</i></p> <p><i>Mrs Mallick: No, no. (Asian Group Transcript #4)[Gender roles]</i></p> <p><i>Maria felt that 10 years ago she was still having to tell people about libraries, and that they were free and that they were useful places, she compared this to M's and thought that a lot of people had no idea they were free, especially when you're not sure what the difference is between the big free museums in town and places like the London dungeon which cost £80 for a family visit, so are prohibitively expensive. [...]</i></p> <p><i>She described what it might be like if you are a new LA person who has just arrived in London, that your priorities are work, often as a cleaner, that then you need housing, food, and papers, and that the social side of things comes after that, and a long way down the line you might start to think about M's etc, [...]</i></p> <p><i>So M's as a concept seems very removed to many people, they don't know what they are or what they're for, so it's a process of discovery for them. So doing 'extra' activities and getting ambitious for your kids only comes after you're quite established, and are low down the priorities list. i.e. you need papers before you can even register for the doctors or the dentist etc. (Latin American Field Notes #1)</i></p>

## Appendix 6: Coding framework for Chapter 6

**Coding framework of interpretive strategies: How participants related (or not) to what they encountered in PES practice**

Falk and Dierking category	Modified category	Modified category description
Personal contexts	1. Personal resources	Use of personal experiences, knowledge, skills and/or ideas to make sense of an exhibit. For example participants sang and danced to make sense of one exhibit.
1. Example Personal resources	<p><i>Mr Bhakta: That's like a peacock,</i></p> <p><i>Emily: Oh ok, yeah so that's male and female, [...] we say sometimes peacock feathers are bad luck</i></p> <p><i>Mr Bhakta: Yeah, especially when, when the monsoon starts, after the first rain, when the smell of the earth comes out, they make a dance, just to attract the female especially, that's what that, it's an eastern bird of India</i></p> <p><i>Emily: Is it, I didn't know, so you've seen lots and lots of these</i></p> <p><i>Mr Bhakta: I've seen so many, in my village, when I went to India, (laughs) in the night time when you go for walk after five o'clock, you can see coming from the farms, groups of 6, they're always in a pair, almost always they stay in a pair, wife, husband, wife, husband, (Asian Group Transcript #2)</i></p>	
Sociocultural contexts	<b>2. Interpersonal resources</b> <b>2.1.1 Within group /Personal</b> <b>2.1.2 Within group /Institutional</b> <b>2.2 Institutional/science centre staff</b>	Combining resources with other people to make sense of an exhibit. For example, one person helping another to understand a display using their own skills or knowledge, people helping one another use institutional resources or a staff member helping someone to understand an exhibit.
2.1.1 Example Within group /Personal	<p><i>[in the aquarium] the adults are talking Temne (I think)</i></p> <p><i>Emily: What are they saying?</i></p> <p><i>Lucille: They're explaining to me about the, you know, snail-fish, how they prepare them back home, (some Temne), and they're saying this one,</i></p>	



	<i>the head of this one, there's a lot of sand in there, so if you don't know how to prepare them, you'll eat a lot of sand, they know all the fish, honestly, it's amazing, they know all of them. (Sierra Leonean Transcript # 5)</i>	
<b>2.1.2 Example</b> Within group /Institutional	<i>Maria: Oh, it's so beautiful inside, look at this one Val, this one's very clever, it says the little butterflies (reading) are called [glasweis] they drink poisonous, it's like juice, from these trees, and that they keep in their bodies, which makes, when someone comes along to come and eat them they taste so disgusting that they leave them alone, so that's how they stay safe all the time, no animals, or insects or anything is going to eat them, cos they taste so disgusting (Latin American Transcript #5)</i>	
<b>2.3 Example</b> Institutional/science centre staff (overlaps with Institutional Resources coding where staff are involved)	<i>Vanessa: What do you think is good about doing this with animals, what do you think is the benefit to people, or how it helps people if we have animals that are taxidermied or stuffed?</i> <i>Mirza: We can learn more about them, isn't it</i> <i>Kirin: The blood, how it should move, you got to know, and remember which pieces (lots of other comments at the same time</i> <i>Vanessa: exactly, so we can learn from them....yeah (Asian Group Transcript #2)</i>	
<b>Physical contexts</b>	<b>3. Institutional resources</b>	<b>Use of the museum or science centres interpretive resources to make sense of an exhibit. For example using a computer interactive or reading a text panel to find information about mosquitoes.</b>
<b>Example</b>	<i>Flor: Oh my god what is that, Sofia, Jesus Christ, (laughs), they're taking the piss, they're taking the piss out of my life, Ignacio look at this, look Sofia: [Hombus Genelous], maybe (reading label)</i> <i>Flor: Oh god, that is, look how big that one is,</i> <i>Sofia: It's a cockroach</i> <i>Flor: I can't imagine seeing that (Latin American Transcript #5)</i>	
<b>[absent]</b>	<b>4. Inaccessibility</b>	<b>Occasions where people could not make sense of what they encountered during a visit. For example, when people could not</b>

		<b>use a computer interactive (institutional resources) or their own background (personal resources) to use a microscope.</b>
<b>Example</b>	<p><i>We went back to the nucleus to play a game at the end [...], which turned out to be about burning. It started with asking us if we wanted to use our photo or a stock photo, so Nadifa, Hamiido and I leaned in to have our photo taken, and Hamiido was in the middle so it took a picture of most of her face, it then did an animation of a chip pan fire, flames everywhere, got us to call the police, and then showed Hamiido's face covered in burns, this was somewhat horrible, and quite weird I think for Hamiido who seemed horrified by this, the game then asked us to skin graft on to her face, which Deepak ended up coming to do for us, because even with Idyl's help we couldn't do it. (Somali Field Notes #3)</i></p>	

# Coding framework of participants' reflections about accompanied visits over time

Coding category	Category description
<b>1. Social experience</b>	<p><b>Instances of the social side of the visit being described as a framing of the visit.</b></p> <p><b>1.1 The visit as a social event</b></p> <p><b>1.2 The visit as a high status event</b></p> <p><b>1.3 The visit as a good day out</b></p>
<b>1.1 Example</b> The visit as a social event	<p><i>Mirza: With a separate room, then they share each other's food and they get used to each other and they can bond with each other.</i></p> <p><i>Emily: So it's a bit more sociable.</i></p> <p><i>Mirza: Yes, friendlier. When we go out we do use the cafés here and there, but especially when we are in a group, it's nice to have some arrangement like that. (Asian Group Transcript#5)</i></p>
<b>1.2 Example</b> The visit as a high status event	<p><i>Hawa also said that the woman who was sick that day didn't have the best time during the visit, but that she felt bad because she couldn't do that much and had to rest, but also when she got home, rang her children straight away to tell them that she'd been to a museum, and that although she'd been ill she had been really glad not to be left out. (Sierra Leonean Field Notes #9)</i></p>
<b>1.3 Example</b> The visit as a good day out	<p><i>Maria: It was lovely to go out as a family, and have a focus, we're going to do that, and not all wondering off to do different things, um, for the little, they all felt it was a special treat, that was nice, (Latin American Transcript #6)</i></p>
<b>2. Learning experience</b>	<p><b>Interpretive experiences being described as a framing of the visit. Includes people making claims about learning, what they could remember, being interested in the subject on display, legitimization of own knowledge and memories.</b></p> <p><b>2.1 Comments about learning through the visits</b></p> <p><b>2.2 Comments about subject interest</b></p> <p><b>2.3 Remembering 'home'</b></p> <p><b>2.4 Legitimation of own knowledge</b></p> <p><b>2.5 Remembering visit content</b></p>
<b>2.1 Example</b> Comments about learning through the	<p><i>Maria: Particularly that age, Val's age, they just absorb everything, it just makes me feel guilty that I'm not educating them more, it's just it's like a sponge at that age, it's such a key age, they can't get enough detail, (Latin American Transcript #6)</i></p>

visits	
<b>2.2 Example</b> Comments about subject interest	<p><i>Mirza: When those kinds of animals are there you will see me anywhere.</i></p> <p><i>Emily: So it's your interest in animals which drives your interest in other things?</i></p> <p><i>Mirza: Yes. (Asian Group Transcript #5)</i></p>
<b>2.3 Example</b> Remembering 'home'	<p><i>Mama Sesay: We see many things, we see the skull, people look back when they see, then I remember, I think, oh, what will come next, then I saw the monkey, the baboons, the fish, and different things, ah, many things we saw, then I remember back home, when we see these, when we see the fish, we go out fishing to catch them, and eat, we see the water and we say, this like Africa,</i></p> <p><i>Emily: So it brings back memories?</i></p> <p><i>Mama Sesay: Yes, and even the leaves on the water, like our own country, I called my friend and said 'come and see this', like our own Africa, (Sierra Leonean Transcript #5)</i></p>
<b>2.4 Example</b> Legitimation of own knowledge	<p><i>Hawa also again mentioned the missing items in the display about female circumcision, that the ladies had been amazed that things that were common to them, that they thought were just minor things, were not common to scientists and to white men, and they had joked that they could make these things and then get paid for them. (Sierra Leonean Field Notes #9)</i></p>
<b>2.5 Example</b> Remembering visit content	<p><i>Kirin: Workshop, was wonderful I think, the thing that most fascinated me was the elephant tooth, [...] so big and heavy, I can't imagine that you know, and all the I still remember her saying, that animal thing, is it a cat that people wear for good luck? (Asian Group Transcript #6)</i></p>
<b>3. Exclusive and inaccessible</b>	<p><b>Descriptions about the visits as something that is not for them. Includes descriptions of other priorities for time and money rather than PES, it's too difficult to go back to, no-one like them there, not being able to understand, learn or find their way, language issues and being unlikely to participate in a similar activity in the future.</b></p> <p><b>3.1 Boring</b></p> <p><b>3.2 Other priorities</b></p> <p><b>3.3 Not what we do</b></p> <p><b>3.4 Not for us</b></p> <p><b>3.5 Language issues</b></p> <p><b>3.6 Not learning</b></p>

	3.7 Not coming back
3.1 Example Boring	<i>Maria: I don't know what there was to get a cool 18 year old in there, I don't think there's anything that's interesting enough or jazzy enough or cool enough or, (pause) it's having something going on beside it, I don't know, I don't know what it is, a dinosaur make over or something (laughs) but most of that age group that are not making their lives academic, the kid in the street, I think it's a bit dry for them, it's the same as when I went to museums when I was a kid, I don't see any changes, (Latin American Transcript #6)</i>
3.2 Example Other priorities	<i>Idyl: I think it's maybe because it's not something really appealing in their life to go and visit a museum or something like that, otherwise they would have put it into a priority I think, (Somali Transcript #4)</i>
3.3 Example Not what we do	<i>Kirin: We don't get much chance to go do museums, but only unless someone introduces that idea to you, then we can say 'ok, we're going', right now, because I'm getting on in life, we go to elderly centres, and someone like you comes in and says 'ok, we take you to museum' but otherwise, unless we get opportunity, you know</i> <i>Emily: So you wouldn't go on your own</i> <i>Kirin: I wouldn't go, no, I wouldn't go on my own, no, (Asian Group Transcript #6)</i>
3.4 Example Not for us	<i>Sofia: Tourists and schools</i> <i>Flor: Yeah basically schools, but I think people from other countries, I don't think people that live in this country appreciate it as much as say someone from France,</i> <i>Sofia: And I think people with a higher income as well would be more likely to go,</i> <i>Flor: What do you mean?</i> <i>Sofia: Cos having a trip out for a day costs a lot more money than you kind of think, even if it's say like initially free to get in, you're talking travel, food costs, going into the gift shop, all of that, so I think as well people who've got higher incomes it's not really an issue, whereas for other people 'oh well, there's however many of us, that's going to add up, and which is a shame cos everything's free and it's like Flor says anyone can enjoy it, but you've got to take all the factors into account (Latin American Transcript #5)</i>
3.5 Example Language	<i>Another negative thing Hawa mentioned was the language barrier, that only some of the women could speak Pidgen (English) and that because of that two of</i>

issues	<i>them dominated the group on the day, and that the other women felt badly about not being able to talk to me and not being able to read all the signs. (Sierra Leonean Field Notes #9)</i>
<b>3.6 Example</b> Not learning	<i>Idyl: There was different games, like the one where you have to play with the, one of them actually completely, I didn't know what I was doing, I was just touching sometimes I was winning really without knowing the reason why I won that game (Somali Transcript #4)</i>
<b>3.7 Example</b> Not coming back	<i>Maria: We'd have to make a real effort to get the outings going, definitely, we tried one actually over the, for the theatre, cos Sofia found out if you queue up on the day of the show at 10 in the morning you get the half-price ticket, and everything, but the friends that went couldn't get enough tickets for the little ones, but that's plan A, is to do that, once the holidays are on, cos the kids just love it so much, just getting away from stress, [...] but nothing can beat an outing, but you do want to have the cash in your pocket, it's bad enough the little ones saying 'I need this', and as well as that everyone else on the street listening, you know, you need to have enough cash in your pocket, (Latin American Transcript #6)</i>